



“THE LYDIA”

Technology Expedition to the Aleutian Islands

# technology review

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## JOURNAL OF THE TECHNOLOGY EXPEDITION TO THE ALEUTIAN ISLANDS, 1907

BY T. A. JAGGAR, JR.,  
*In Charge of the Expedition*

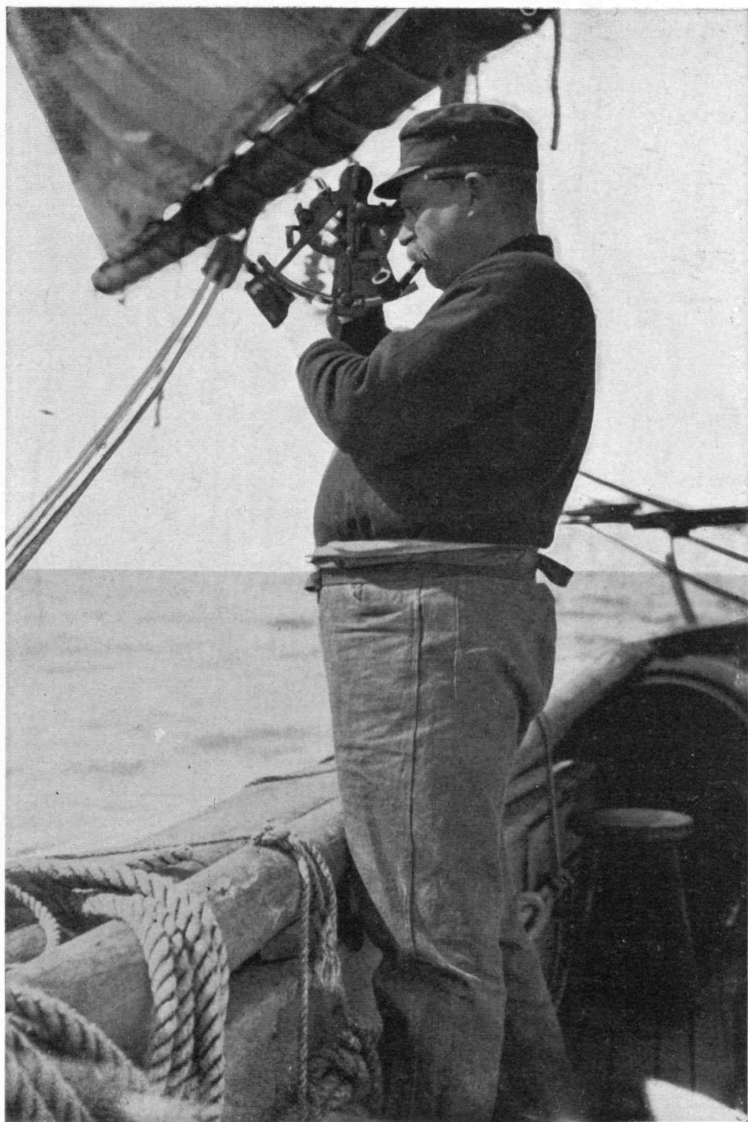
*April 13, 1907.*—On this date the writer left Boston for San Francisco, arriving Thursday morning, April 18. On the 20th of April he left for Seattle by the Shasta route, arriving there April 22. During the following month the various members of the scientific party convened in Seattle at the Hotel Lincoln, where headquarters were established. After an examination of all the shipping in or near Seattle for a fortnight, I bought the schooner "Lydia," 39 tons gross, 37 tons net, 62.6 feet long, 20-foot beam, 7.0 feet deep. The "Lydia" was built by Matthew Turner at Benicia in California in 1889 for the sea-otter trade on the coast of Alaska, and she was first used in that service near Kodiak. Carl Guntert, from whom the vessel was bought for the Technology Expedition, agreed to serve as sailing master for the voyage. Mr. Guntert shipped on April 29 and engaged sailors; but within a week he announced his determination not to go with the expedition, and it became necessary to prolong a delay already too great, owing to alterations, repairs, and preparations, and to set about a systematic search for a captain. Thanks to the kind assistance of Captain Rhodes, of the Coast and Geodetic Survey, the services of Captain George Seeley, of Seattle, were finally secured, and, as the event proved, no better officer could have been found. The success of the voyage was largely due to his careful navigation and thorough knowledge of sea-craft, no less than to his wise selection of a competent crew and an efficient mate.

The "Lydia" was unprovided with auxiliary power, and it was not found

possible to buy or charter a satisfactory auxiliary schooner suitable to the purpose of a cruise in the Aleutian Islands. The schooners used in Puget Sound and on the inside passage to southeastern Alaska are commonly converted into power boats, and are no longer seaworthy sailing craft for ocean voyages. Accordingly, after it was decided that the expedition should trust mainly to a sailing-vessel, it seemed best to carry on deck a launch, equipped with as powerful an engine as possible. For this purpose a 23-foot life-boat was bought, a 7 horse-power standard engine was installed in this boat, and cradles were built to hold the launch on the forward port deck of the "Lydia." This launch proved serviceable in the harbors and bays of the islands for purposes of local exploration. The throat-halyards of the fore and main rigging were used to float and ship the launch. She proved unwieldy for rapid handling, the engine being somewhat too heavy for the hull in which it was set up. This condition subjected the launch to undue strain while she was being lifted over the bulwarks, and made it impossible to use her in many places where a lighter boat could be put overboard with facility. The "Lydia" was equipped with two fisherman's dories, and, on the whole, these are the most seaworthy and reliable tenders a sailing craft can have in Alaskan waters.

The weeks spent in Seattle were actively employed in collecting stores, instruments, charts, books, fishing-tackle, ammunition, ship chandlery, fuel, bedding, clothing, tools, camp kit, articles for trade, and the multifarious impedimenta of a long voyage. The delay became so long and the voyage by sailing-vessel promised to be so slow with the prevailing head-winds that I decided we could not hope to go north by the coast route, but would have to head straight across the North Pacific westward to Unimak Pass, making that the starting-point for scientific work among the islands. The original plan contemplated heading from Unalaska westward on the north side of the Aleutian chain to Attu, and making that extreme western island of the American possessions the starting-point of a cruise eastward through the islands, with the prevailing west wind then favorable. This might have been accomplished if the start from Seattle could have been made early in April; but the late start defeated this plan, and made it necessary to begin work as soon as the islands were reached, and cruise slowly westward.

The original scientific party consisted of myself, geologist; Professor H. V. Gummere, of the Drexel Institute, Philadelphia, magnetician and astronomer; Professor A. S. Eakle, of the University of California, mineralogist; Dr. Edwin C. Van Dyke, of San Francisco, physician, entomol-



CAPTAIN GEORGE SEELEY, SAILING MASTER OF THE "LYDIA"



THE SCIENTIFIC PARTY

JAGGAR

GUMMERE  
SWEENEY

VAN DYKE  
MYERS

EAKLE

ogist, and botanical collector; Mr. Desaix B. Myers, of Philadelphia, and Mr. H. P. Sweeny, of Stroudsburg, Penn., of the class of 1908, M. I. T., assistants in geology and mineralogy. The party in Seattle was joined by Mr. Francis T. Colby, of Boston, accompanied by Mr. John Cody, a Canadian trapper and woodsman. Mr. Colby was interested in the larger mammals of Alaska, and with Cody he accompanied the expedition as far as Unalaska. The two then proceeded to the peninsula in search of big game, and Mr. Colby afterwards sent in some valuable notes on occurrences of coal on the Alaskan Peninsula and other observations of interest. Mr. Cody, on the voyage north, proved of the greatest service to the expedition, as he was by trade a carpenter, and he built many fixtures for the schooner and launch which were useful throughout the voyage. All the members of the party worked vigorously during the days of preparation in Seattle, and I take this opportunity of expressing my gratitude to one and all for their painstaking labors during many trying days of vexatious disappointment and delay.

The "Lydia" was at length fitted for sea. Thanks to the prompt work of Mr. Hibbs, naval constructor of the Moran Shipbuilding Company, a new galley and toilet were built on deck forward of the after-cabin; extra berths were built into the port side of the hold abaft the mainmast and in the forehold for the extra members of the scientific party and for the ship's officers respectively. The after-berths were connected by an open doorway with the cabin. On the opposite (starboard) side of the vessel a room was partitioned off to hold cabin luggage and camp kit. Eight berths were provided in the cabin, three in the forehold, a berth was built in the galley for the cook, and the forecastle accommodated the four seamen. The ship's company numbered fifteen at the start,—captain, mate, cook, four seamen, and eight of the scientific party. Twice during the two weeks preceding the start there were desertions on the part of members of the crew, the last desertion being on Sunday night, May 19, the very eve of departure. The "Lydia" sailed under a yacht's license.

*Monday, May 20.*—At 4.24 P.M. Captain Seeley cast off from the buoy in Seattle Harbor, and for a mile the vessel was towed by a gasoline launch until clear of the shipping. Then we made sail, flying the ensign over the M. I. T. pennant. The wind fell to a dead calm in the night.

*May 21.*—The ship lay off Ballard in the morning, not far from the city. With light head-winds she tacked to Port Townsend and rounded the point separating the inner sound from Juan de Fuca Strait. In the night we lay off Protection Island.

May 22.—With a glassy calm in the morning no progress whatever was made. The sea life was swarming,—medusæ, large and small, tunicates, fish, birds, and porpoises. The water was warm, and several members of the party went in swimming. A brisk westerly wind sprang up about 4 P.M., and in a very short time the "Lydia" was pounding into a choppy sea off Race Rocks, with her rigging dangerously loose. This test, before going to sea, proved a valuable one, as it gave us a chance to put in and overhaul the ship before making the open ocean.

May 23.—We made harbor at Port Angeles and went ashore. The extra mainsail was shipped back to Seattle by packet, to be altered to fit the ship, and an order was sent for a shipment of cordage and blocks necessary for repairs and renovation of weak rigging. Messrs. Colby and Cody went into the mountains to the south-west for a short trip.

May 24.—An extra able seaman, to make up our complement of four, arrived from the sailors' union in Seattle. I decided, in view of the prospect of a week's further delay at Port Angeles, to take the scientific party ashore and make an experimental camping trip, in order to try out the light tents and knapsacks and find out what would be needed and what would be superfluous in the barren grassy wastes of the Aleutian Islands. About 4 P.M. the party went ashore to the east of Port Angeles in a dory. We landed at the mouth of Morse's Creek and pitched camp amid gigantic Douglas firs on the ranch of Mr. Hemme, who received us hospitably. The camp ground was on green grass by a cold stream, with a fine view of the snowy Olympic Range up a valley to the south. Tyee salmon were running in the stream. The wind blew strong from the west. The party consisted of Gummere, Eakle, Van Dyke, Myers, Sweeny, and the writer. We used a Sibley tepee tent of paraffined silk, and each man carried a *Rucksack* with a share of the provisions. The latter were distributed in small duck sacks, and carefully weighed on a basis of rations for a specified time. The food supplies of the expedition were of two types, those requiring cookery and those which could be eaten without heating. Among the former were the usual staples,—flour, rice, tea, coffee, cereals, bacon, evaporated eggs, evaporated fruit and evaporated potatoes: among the latter the chief were California figs, "force," "grape-nuts," dried (chipped) beef, boiled ham, hardtack, seeded raisins, evaporated cream, cheese, butter in tins, tinned meats, sardines, and marmalade. The cooking devices were also of two kinds,—the "Primus" oil stove for cooking in tents where firewood is wanting, and a sheet-iron folding box stove for either tent or the open where firewood (usually drift logs) was available. The

"Primus" was found invaluable, both for warmth and cooking, in the raw climate and woodless lands of the Aleutians. The camping equipment was supplied by Abercrombie & Fitch, of New York.

*Saturday, May 25.*—We left the tent as our main camp and took light packs for a march into the timber up Morse's Creek. The windfalls of enormous trunks made the travelling extremely arduous and slow. On a deserted ranch three or four miles up the valley, known as "Spencer's," we made an impromptu open-air camp without shelter. In the stream bed appeared outcrops of upright or slightly contorted shales striking E.N.E. The night was cold. No cooking except tea was attempted on this trip, and the various forms of ready cooked food were found palatable and satisfying.

*May 26.*—We discovered a trail which led out from this ranch in the woods to the westward, and at about the distance of a mile came into a highway leading southward towards the Olympic Range. We cached our packs by this road, and then tramped southward into the mountainous foothills, reaching an elevation of 1,200 feet above sea-level. The timber is heavy over the whole country, with some cleared farm lands near the roads. The mountain ranches appear prosperous and well kept. We walked six and a half miles, lost Dr. Van Dyke at the luncheon hour, he having been diverted from our route by the allurements of beetles. He returned to us, however, in good season, on the West Fork of Morse's Creek, where we rested in a valley, looking up at near snowy mountain peaks. We returned by the road northward to the tent at sea-level. The weather was hot.

*May 27.*—The wind blew hard from the north, making the long pull by dory back to the schooner too severe a task to attempt. The party remained in the vicinity of the camp, practising salmon-spearing with a huge five-pronged spear belonging to our landlord, and doing some trout-fishing. The trout were small. The dory was moved to a more convenient location near the camp, in order to be ready for an early start. Some members of the party did a little target practice, in order to adjust the sights on rifles.

*May 28.*—The party broke camp early and shipped the outfit on the dory. Myers and Jaggard rowed the latter back to the "Lydia," the others walking west along the beach to Port Angeles. At the ship it was found that Cody and Colby had returned on Sunday, and Mr. Colby had driven a nail into the sole of his foot. From this injury, however, he promptly recovered. The work of renovating the schooner was finished, and at noon the refitted



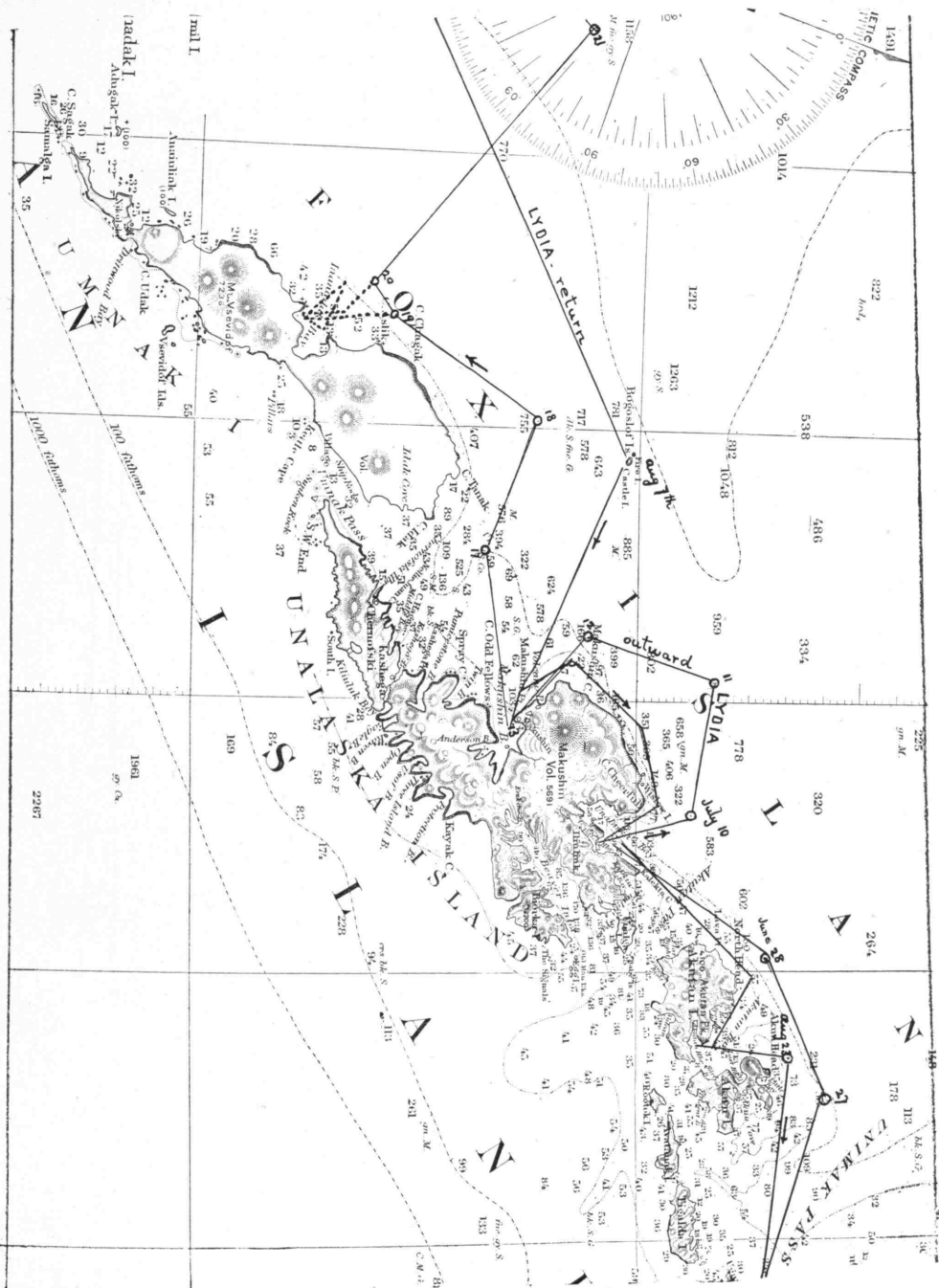
mainsail arrived at Port Angeles by the packet. After a trip ashore to take off the pedestrians, the captain set sail, and at 4.30 P.M., with a westerly head-wind, the "Lydia" beat out into the strait and started on her long voyage. There was some sea and some *mal-de-mer*, but during the night the wind failed.

*May 29 to June 26.*—The long voyage west was uneventful. The bobstay carried away twice, and head-winds prevailed. The vessel was unceasingly followed by a barnyard of "goonies," black albatrosses. Their aëroplane evolutions and squabbles over refuse from the ship were an endless source of amusement. On June 6 a giant kelp was picked up, like a big whip 43 feet long. It was covered with goose barnacles, worm-like crustaceans, and algæ. The "Lydia" proved tight in heavy weather. On Sundays service was held in the cabin at 10 A.M., the officer of the deck usually attending. Whales and porpoises were seen from time to time, and one fur seal appeared, far out in the Pacific. On June 14 the "Lydia" made 162 knots in twenty-four hours, with a south wind. This was the only fast time, however. On the 15th Mr. Frank Seeley, the mate, had a narrow escape on the after-end of the main boom. He was standing on the foot-rope, which parted, and he caught himself with his arm around the boom. The first ship sighted was on June 17, off Kodiak. On June 22 a hard blow from the north made it necessary to eat meals off the floor. The ship was heeled well over. In an effort to manage a cup of tea and a plate of dinner on the windward, or upslope, locker, I lost my grip, slid across the cabin into the dishes, wrecked my plate, and poured the cup of tea down my neck. This was a common diversion. The occupations of the scientific party during the voyage were various,—overhauling outfit, preparing food in sacks for the land trips, reading, writing letters home, and painting various articles in need of paint. The captain is an artist, and in his "cabin" in the forehold has a picture of the "Lydia" painted on the forward bulkhead. Above are the words "God bless our Home," and underneath "No cussin aloud." The last is an adaptation from one of the "regulations" promulgated before the ship left port.

*June 27.*—At 5 A.M. the island Tigalda was sighted after twenty-nine and one-half days at sea. The day opened fine, but the wind fell. On the banks south of Unimak Pass the cook caught two big codfish. There are many gulls, puffins, and brown "whale birds" about; and one small seal, probably a fur seal, was seen. At 1 P.M. a strong north-west wind sprang up, and the "Lydia" tacked up against it into the broad Unimak Pass between Ugámak and the snow-clad heights of Pogromnoi Volcano



MAP OF UNALASKA AND ADJACENT ISLANDS



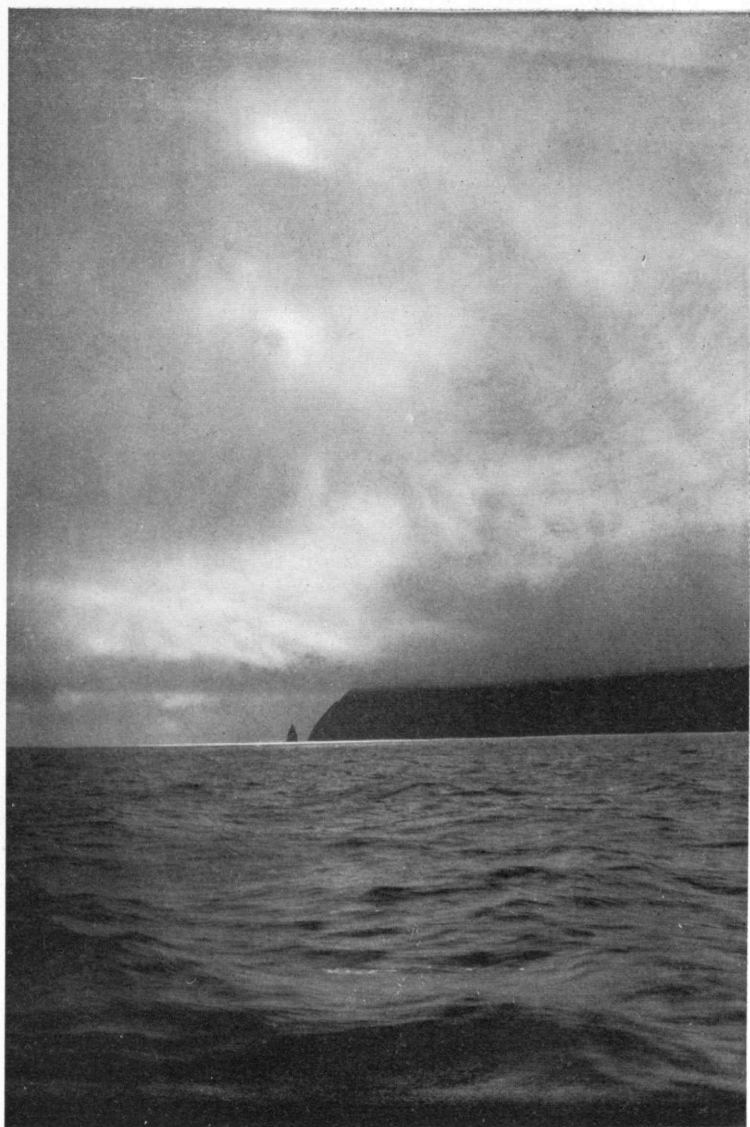
on Unimak Island. Pogromnoi is a conical peak rising from a long flat dome which looks like one of the flat lava heaps of the Sandwich Islands. Coming out of Akutan Pass to the south, a full-rigged ship was seen. At five o'clock in the evening, fog settled into the pass and continued all night. The wind fell. Before entering the fog, we saw the light-house settlement on the east side of the pass, and obtained photographs and sketches of all of the islands in sight, six or eight in number. They are bold and grass-clad, not a tree in sight. Steep cliffs rise from the waves, and the profiles show either cones or saw-teeth. The higher cones are snowy on Unimak, Akun, and Akutan.

*June 28.*—The morning found us off the north side of Akun Island. At 10 A.M. the fog cleared under a north-east wind. Whales, guillemots, and puffins are about. Akutan to the S.S.E. is in an interesting stage of volcanic activity. Both Akun and Akutan possess very recent steep cones. On the north side of Akun the crater has apparently been breached by the sea. Akutan has two recent volcanoes, a high snowy one and a lower active one nearer the shore. This latter is throwing up columns of black factory "smoke,"—steam charged with dust. The crater opens toward a gulch on the north, and the fissure whence the explosions rise is east of the head of the gulch. At the back inner wall of the half-open bowl, as one sees it from the sea, there appears to be a great black cavern under the snowy crest of the mountain. The mountain rises perhaps three thousand feet above the sea. On the slopes and in the gulch descending from the crater there is much snow, soiled with new-fallen volcanic dust. The "cauliflower" clouds of black dust which rise from time to time have all the characteristic hard vortical convolutions of what Kennan called the "mud smoke" of Mont Pelée in Martinique. The lower snow limit is about the 1,000-foot level in Akutan. On the point of a spur two benches cut in hard rock appear in profile against Akutan Pass, and these suggest recent elevation of surf-worn benches. The same thing was noted, on first sighting the islands, on the south side of Tigalda. This is an earthquake belt, and by gradual slips the islands are probably rising under stress.

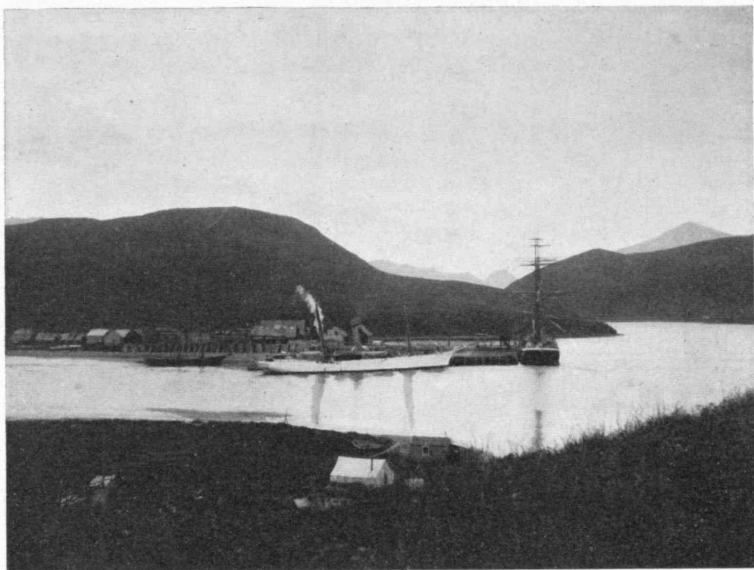
The evening of this day will long be remembered by every member of the party. Across a glassy calm on Bering Sea the sun's disc set glowing red, with a singular symmetrical deformation by atmospheric layers that made it appear like a lamp with annular swellings. Far ahead to the west the snowy dome of Makushin, cold and arctic-looking, was all that could be seen of Unalaska, otherwise "hull down," as the mariners say. But, on

looking back to the east, the snowy heights of Unimak, fifty, eighty, and a hundred miles away, glowed pink in the evening light, and for the first time we saw—Shishaldin. For two days we had been looking for this famous volcanic peak, rising, like Fuji, a pure snow cone 9,000 feet from the sea. Some one distinguished a salmon-colored cloud in the background of Pogromnoi. Still farther back the sky was purplish blue-black, and this background revealed to our wondering eyes the fact that this cloud was a sharp-pointed, delicate cone, clear, perfect, and dominating even the nearer peaks, though its base vanished into an opalescent haze. Between eighty and ninety miles away, still it rose supreme, like a great white throne tinged with the sunset light.

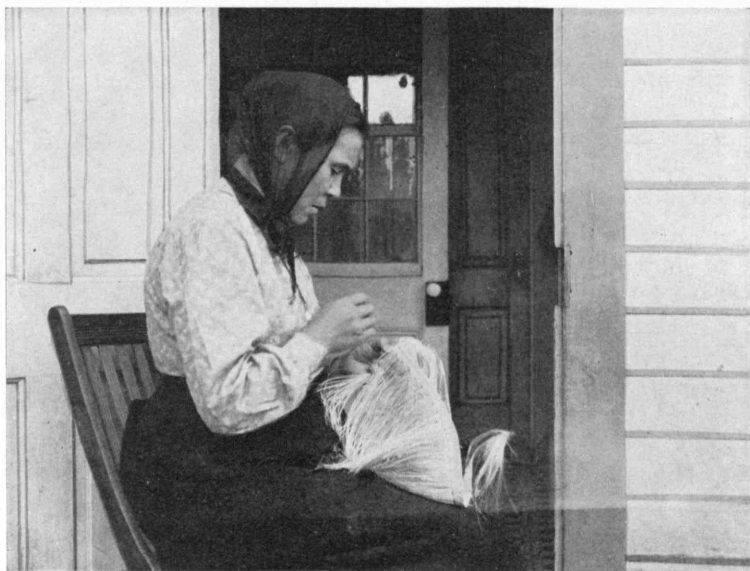
*Saturday, June 29.*—During the night a south-east gale began to blow, giving us a preliminary good sample of the sudden changes of Aleutian weather. It is a land—or a sea—where never twenty-four hours go by without rain. The wind blew the “Lydia” forward on her course, but right across the tide-rips of Akutan Pass, and the night was a strenuous one of pounding, rolling, and great swashes of salt water across the deck. At four A.M. I came on deck and found the fog clouds just rising enough to show deep fjords and rocky headlands with waterfalls tumbling over cliffs into the sea. At first we mistook a deep bay beyond Cape Cheerful for Unalaska Bay, but the captain quickly recognized his landmarks as the clouds rose higher. The vessel was brought up into the wind, and we stood off towards Priest Rock. This is a sentinel at the eastern entrance to Unalaska Bay, looking quite like a robed priest with his face to the north. All of the Aleutian headlands are likely to show these isolated rocks in the water at the end of the spurs. They mark places where marine erosion has attacked the points from two sides, opposed coves have met, and a rocky outlier results. The sun burst through the low-lying clouds, making wonderful lambent trails and light-bursts on the white-capped waters as the little ship tacked back and forth swiftly until she came to rest in the deep arm of the bay which separates Amaknak Island from the Unalaska mainland. Ahead was seen the long line of houses on the strand,—Unalaska or Iliuliuk Village,—while on the right, in a cove of Amaknak Island, behind a sand spit, could be seen the flag and wharf of the North American Commercial Company’s station at Dutch Harbor. We came to anchor, got the launch over the side, and then towed the schooner up to the wharf. At about 10 A.M. all was snug, and once more we felt firm land under foot. Professor Gummere, assisted by Mr. Sweeny, at once set off with his magnetic instruments to set up on the station which had been occupied by



PRIEST ROCK, UNALASKA BAY.



UNALASKA VILLAGE



ATKA WOMAN WEAVING BASKETRY BELT

former observers. We found some mail at the post-office. I made the acquaintance of Captain Rogers, of the revenue cutter "McCulloch"; of Captain Applegate, formerly United States Signal Service recorder, and now a resident fur trader of Unalaska; and of Messrs. Harman and Gray, respectively United States marshal and Alaska Commercial Company's agent. The coastwise packet "Dora" lay at the wharf when we arrived, and left in the evening for the north side of the Alaskan Peninsula. Messrs. Colby and Cody decided to leave the main party and proceed to the peninsula via the "Dora," and they accordingly transferred their equipment to her deck and bade farewell to the "Lydia" and their cabin companions. They later reached Herendeen Bay, crossed the peninsula, and had many adventures in the vicinity of Seldovia and the Kenai.

*June 30.*—Professor Gummere has discovered that in some unexplained way one of the pivots of an important magnetic needle belonging to the dip circle is broken. This will seriously hamper his work. Dr. Eakle and Mr. Myers to-day visited the "Unalaska Gold Mine," an abandoned prospect hole and small stamp mill on Captain's Bay, the inner arm of Unalaska Bay, south of Unalaska Village. Captain Seeley and I dined with Mr. Schroter, manager of the North American Commercial Company, and much of the day was given to cleaning up, reading, and writing letters, and completing preparations for a start towards Makushin Mountain overland to-morrow. In the evening, accompanied by Gummere and Sweeny, I climbed the mountain north of Dutch Harbor, some 2,000 feet high, and obtained a superb view of the great fjord, Broad Bay, on the western side where we plan to start inland, and the snow-clad Makushin and other lower volcanic cones which make the highlands of northern Unalaska. Beneath our feet was a wonderful carpet of fragrant, long-stemmed flowers and grasses, lupines, anemones, orchids, marguerites, and many others in profusion. There are no trees except a small clump of spruces planted by the Russians about 1840. These are flourishing, and show that trees would grow on the islands if once they were given a start. In the bottom-lands there are some willows: these are practically the only shrubs.

*Monday, July 1.*—The morning was spent by all hands in preparing *Rucksacks* and camp material. The food was carefully weighed, tents and kit apportioned equally, so that each man should carry about forty pounds. Each man had a sleeping-bag, the Kenwood, Johnson, eider-down, and fur bags claiming each its champion. Captain Seeley beached the schooner at the head of the wharf, and will repair the bobstay and otherwise overhaul and repair defects discovered during the voyage north. At 4 P.M. the party

embarked in the launch, manned by Mr. Seeley and Fred Schwartzlose, the German sailor (the other sailors are Scandinavians). A dory is always towed after the launch on such occasions, so that the latter may be anchored and a landing made easily on any beach. It is possible to safely beach the launch, but not in a seaway or on shoals. At Unalaska the services of Garman Stepetan, a full-blooded Aleut, were secured as guide. Two hours' run took us through the strait between Amaknak Island and Unalaska and then across the greater fjord to Broad Bay, where a landing was made. The dory was kept and the launch sent back. Packs were at once strapped in place, and the march began, Garman leading the way past a deserted sod house (*Bara-bara*), and then across miles of wet marsh. A stream called Glacier River occupies the valley we were ascending. The hummocky grass made walking very laborious, and we learned from this experience never thereafter to start inland without high-topped rubber boots. Ahead of us loomed the mighty, snow-clad dome of Makushin Mountain, like an Alaskan Jungfrau. So late was the start made that it soon became necessary to camp on a grassy terrace at the side of the valley. Tents were quickly pitched, and the "Primus" stove was soon sending up a savory odor of bacon and flapjacks. In the night it rained, as usual.

July 2.—The morning was rainy. We cached a tent and reduced our loads, and pushed on up the wet valley bottom. On a terrace near a point where the valley narrows down to a box canyon a second camp was made. Here some former prospectors had left heaps of bituminous coal carried thither in sacks. In the rain and fog the coal fire was very welcome. Dr. Van Dyke is an indefatigable collector of insects, and the minute we dropped our pack, he was off, whacking the bushes, overturning big stones, and plying his forceps and little glass phials. The Glacier River is 70 yards wide in places, and, where it emerges from the canyon above, there are on its bank two pronounced gravel terraces, one above the other, sloping gently from a greatest height at the mouth of the canyon to the level of the flood-plain a third of a mile and a mile down the valley. These appear to be the product of some former flood, perhaps of volcanic origin, whereby a great volume of *débris* was deposited in a long, flat fan-cone at the mouth of the canyon, and this has since been trenched in two stages by the stream. On the sides of the valley, which is three-quarters of a mile wide, mountain walls rise with steep 40-degree slopes. The lateral gorges have deposited fan-cones at their mouths. A flat plateau, 1,000 feet above the valley, ramifies into the intramontane higher valleys as an old terrace level of doubt-



ful significance. It may be an old baselevelled surface. The snow on the mountains is patchy except where the glaciers cover Makushin. In the stream gravels the rocks are mostly basaltic, with some fine dark slaty rocks and crystalline pebbles of the appearance of diorite.

*July 3.*—All turned out at 3 A.M., Eakle and Myers to explore the northern volcanoes, Jaggar, Gummere, Sweeny, and Garman to climb Makushin, and Dr. Van Dyke to accompany the Makushin party to the snow line, there to branch off and collect plants and insects. Fog clouds lowered over the valley; but the heights above proved clear, and the day turned out a favorable one. The way up Makushin led first up the steep valley wall by a zigzag path to the thousand-foot level, then across the upland, which shows sections of peat interstratified with sand and gravel in the stream trenches. At the north base of the mountain a subsidiary cone rises a thousand feet, known as Sugarloaf. The flowers become alpine in character as the snow line is approached, the heather being particularly in evidence. We circled Sugarloaf, crossed some rugged spurs and snow patches, donned our snow-glasses, and began the long trek over the smooth glaciers, armed with ice-axes, but without roping. The climb was long and easy. The crevasses are few and small. It is practically a continuous snow slope through which rise some jutting black crags which show old basalt lava sections cut by dikes—fissure-fillings of lava. The higher slope of the mountain shows crevassed glaciers or séracs on the north and north-east side. The rim of the greater crater was finally reached at 12.45. Within was an expanse of snow, probably two miles in diameter, through which three or four steaming vents have maintained openings. Here we encountered fog and rain lifting and closing at intervals. We saw a steaming cavity ahead to the right. Examination proved this to be a new crater opening which was unknown to the guide, therefore it was promptly named the "Technology Crater" of Makushin. It is a vertical cavity in the snow, 75 feet in diameter, with a 300-foot wall of bedded ice and snow behind it and sulphurous steam incessantly rising through it. A great tumble of snow or ice blocks rests in front of it, and, where the steam drifts across these, their white surfaces are yellowed with sulphur. We descended to the edge of the ice vent and looked in: it appeared to go down into everlasting blackness, and we did not follow it. There is probably from 600 to 1,000 feet of snow and ice filling the greater crater, and a steam vent in its floor has melted out this hole to the upper surface.

An inner cone of boulders and sand was seen beyond the Technology



Crater and south of it. This was visited, and found to contain a crater some 2,000 feet in diameter, with very active solfataras or steam vents working on its northern side. There are some sulphurous coatings about the steam vents. The crater and cone are buried in snow on the south, and an ice wall four hundred feet high has been melted bare on the side toward the steam jets, within the crater. We crossed the bottom of the crater, taking advantage of a breeze which blew the noxious fumes northward, and found a pool of clear snow-melted water, which was draining into steam-holes. At a lower level within one of these cavities was a cauldron of black boiling mud, fifteen feet across. We climbed the west wall of the crater to the rim. The guide had refused to follow the party down into the crater, and we had refused to follow him across the snow, where small holes occurred, revealing columns of hot vapor. These were doubtless the tops of great melted out chambers in the ice, and we preferred to reach the bottom of the crater on foot rather than by a thousand-foot drop through one of those holes. The guide tried to reach the western rim by some circuitous route, and the scientific party meanwhile went back across the bottom of the crater, thereby losing the guide. Arrived at the bottom on the return trip, we found that the wind had changed, making it necessary to hold one's breath and run for it through the sulphur steam, trusting to luck not to fall into the cauldron of boiling mud. All accomplished this trip in safety, and after some hallooing in the fog the guide was recalled and our footsteps across the snow were retraced to the great rock rim and down the mountain. There are other active vents, but time did not allow a visit to them on this occasion. A wonderful panorama spread before the party as it emerged from under the summit clouds. Numberless snow-spotted mountains under a dull sky extended as far as the eye could reach across the eighty miles of Unalaska. Far to the east could be seen the great fjord and Amaknak Head, and beyond was Akutan, majestically spouting up four black puffs in succession as we watched. On the black ocean a speck of light moved by, the cutter "McCulloch" heading westward on an annual visit to Attu. Great moraines were crossed at the lower or north-east end of the glaciers, and at the foot of these is a circular basin encompassed by precipices. This basin is the head-water amphitheatre of Glacier River, which bursts through the moraine,—a product of the melting of the hot volcano's eternal ice covering. The return to camp was fearfully laborious, for our muscles were soft as yet and the steep path downward of the last stretch was peculiarly trying. The writer was the last man to arrive, at 11 P.M.,—a twenty-hour day. We found Dr. Eakle and Mr.



### A STEAMING CRATER IN SNOW

The "Technology" Crater of the Volcano Makushin, Unalaska



NATIVES, ATKA. THE CHIEF ON THE LEFT



NATIVE CHESS, ATKA

Myers back in camp after a long and adventurous day among the northern mountains.

*July 4.*—The national holiday was celebrated in a wet and foggy camp, with no fireworks beyond an extra ration of maple sugar or sweet chocolate. Dr. Eakle investigated the river gravels, and returned to spend the night at the lower cache. Garman made a double trip to the cache and back for supplies. Gummere and Myers attempted to reach the glacial amphitheatre for photographs, but were thwarted by the fog. Sweeny and I returned to the upland with a view to exploring Sugarloaf. Dense fog and wetness was on everything, and guidance by compass across the tundra and snow fields was very uncertain. We found an arroyo with peat and lignite beds on the banks, and gave considerable time to making collections. A startled pair of arctic ptarmigan circled about us. As twilight was approaching, the fog lifted a little and revealed the fact that we were working in the mist only a few hundred feet from Sugarloaf, almost under its shadow, and had passed it by without seeing it.

*Friday, July 5.*—With wet and heavy packs, encumbered by many specimens, the expedition started down the valley on the return trip. Arrived at the beach, it appeared that the steam launch "Clara" had been sent for us, but had returned on not finding the party ready at precisely the hour appointed. There is no harbor at Broad Bay, and much exposure to the ground swell of Bering Sea. A fire of driftwood was built on the beach (it was raining, it is always raining except where otherwise mentioned) and photographic portraits were made of the whole "outfit." I proposed to Sweeny that we stay out two nights longer and make an attempt to reach an attractive young volcano which rears its head north of Broad Bay on the west side of Unalaska Bay. He assented, and we gathered together the remainder of the dried beef and hardtack, while the rest of the party bundled into the dory and rowed away to Dutch Harbor. Our route apparently lay along the beach for a mile, then up a grassy slope between two cliffs, and over spurs of the mountain beyond. The bay was full of huge black whales, puffing and snorting in endless succession. Sixty whales were in sight at one time. It seemed as though the bosom of the deep were heaving sighs to think that foolish mortals could enter upon such a hare-brained scrape as we were presently involved in. We started up the grassy slope with heavy packs, Sweeny with a pick hammer, Jaggar with the bamboo tent-pole for an alpenstock. Arrived at an elevation of a hundred feet, the slope, so innocent from below, became a succession of concealed benches. Sweeny, slightly above and to the right, was absorbed in *cutting*

*steps* in the crevices of the slope for his feet. His companion was unprovided with a pick for the purpose. We agreed to drop our packs,—to retrace steps downward was impossible,—and the packs bounded suggestively from ledge to ledge and rolled in fragments to the water's edge below. Once more to our perilous task, onward and upward. "Sweeny, in about a minute I am going to follow the packs!" But Sweeny was too much absorbed in his own troubles to notice. Sure enough, the ground slipped from under me, and I shot downward and outward. It was a relief, however, to note that in rolling over on his back the body of a man behaves like a log in a skidway instead of rolling and bounding like the packs. Professor J. stuck on a bench with legs dangling, and succeeded in wriggling back and building a pebble bank under him so as to assume a sitting posture. Sweeny had disappeared. Two bald eagles, startled by the latter, soared in great circles. On looking up, behold there was the eaglet solemnly cuddled into a corner of the cliff, and all the nature-study stories came back to me with startling vividness. The larger eagle would swing away out over the puffing whales and then circle back and swoop down, moving his head from side to side, so as to see his victim first with one eye and then with the other. "He knows I am helpless," came the bookish thought. But he always changed his mind when he reached the point where every detail of those awful talons could be seen. Sweeny finally succeeded in opening communications by shouting and in reaching a point on top of the cliffs where he could see me. I asked him to get down to the packs, if possible, and he disappeared. Then arose meditations on the possibility of staying perched there, plastered to the face of nature five hundred feet above the sea, for perhaps two days, until help came. And the whales continued to puff,—thud, p-S-s-s-s . . . now and then sounding, when an enormous forked tail would be left sticking straight up and slowly sinking. Sweeny finally succeeded in getting down by sliding, after various adventures over waterfalls and wading up to his middle in sea water around the ends of precipices which descended vertically to the bay. Great was the relief of the perched one at seeing him beside the packs on the beach. After a short colloquy, wherein it appeared that, if one slid on his back and edged to the right, a precipice just below might be avoided, I decided to take chances, and so wrapped my head in a polka-dot kerchief and "cut loose." As it turned out, the downward slide in leather coat, heavy boots, and gauntleted gloves was no difficult task. The tent-pole was rescued on the way, and in a few minutes professor and pupil were reunited, the former grateful for the latter's instruction, and wiser concerning the peculiarly

high grades of Aleutian slopes, masked by long grass. The slope in question when measured averaged 42 degrees. Any grassy slope over 35 degrees proved impassable without rock irregularities or steps.

The day was so far spent that there was nothing for it but to gather up the packs, return to a spring at the end of Broad Bay, and set up the pyramid tent amid the grass hummocks. All the driftwood was so wet that we could not make it burn. Thoroughly tired out and very wet, after a cold supper the two luckless voyagers wrapped themselves in their sleeping-bags and slept.

*July 6.*—Thoroughly tired after yesterday's efforts, there was still a lingering hope that we might cross the mountain ridge north of us and make our way to the volcano. We climbed this mountain by way of a 35-degree slope, and found ourselves incapable of more. The view from the summit showed a broad valley beyond and yet another mountain ridge between us and our goal. The return down the soft carpet of flowering plants was accomplished by the method discovered on the "eagle cliffs" with great celerity, and leaving two singular pathways straight up to the summit. The bottom land of Glacier River shows some abandoned beaches back from the water front, abandoned meanders marked by apple-green belts of fresher verdure, and two little tarns of very clear water and considerable depth occur at different levels on the north border of the valley at the foot of the mountain. They appear to have been formed by ancient landslides. Everywhere on the mountain slopes and in the valley are the most beautiful flowers. We collected dried willow fagots, carried them back to camp, and cooked a hearty meal of pea soup, tea, and apple sauce. The weather was rainy.

*July 7.*—Again there are forty or fifty whales making the bay breathe. It is a calm morning, and thousands of white sea-birds are out upon the water. We broke camp, Myers and Gummere came for us in the launch, and on the way home we explored Captain's Bay. Ducks, puffins, and divers were seen in abundance. Some experiments were made in sailing the dory and beaching the launch. The revenue cutter "Perry" has come into Unalaska with two Japanese schooners in tow. They are seal poachers, taken red-handed off the Pribilof Islands by the steamship "Manning." After returning to the schooner and preparing letters and despatches, I called on Commander Werlich, U.S.N., in charge of the light-house tender "Armeria," and, thanks to his courtesy, was enabled to send off material for prompt transmittal to Sitka.

*July 8.*—All day long a violent blow and rain from the south-east, a veritable Alaskan "woolly," made any progress impossible. At night films



were developed. It is profitable to develop photographs as we go. The dampness otherwise is almost certain to damage films which have once been open and exposed.

*July 9.*—After making last purchases at Unalaska, an interesting lot of information was obtained from Captain Dirks, who for many years has kept stores in Atka and Attu. From a study of the charts with Captain Dirks I learn that there are two marked belts in the islands, a northern and a southern, characterized by different geological habit. In the northern belt are all the active volcanoes. In the southern are the older formations. In many places these two belts are quite strongly marked by the topography. Thus in Unalaska and Atka there are deep bays east and west, which lie in the dividing line. It promises to be a matter of the utmost interest to learn what the principal differences of the two belts are. The fact that the volcanoes lie on the side of the concavity of the curve of the chain, toward the smaller sea, is analogous to conditions in the Caribbees and elsewhere. There is one hill near Captain's Bay containing a granitic rock, diorite. Captain Applegate informed me this was said to be the only granite in Unalaska. Later discoveries disproved this. A native of Unga, of creole blood (that is, partly white and partly Aleut), William Gardner by name, has been engaged to act as pilot and interpreter in the western islands. He is a hunter by trade, and has hunted foxes on Adak, west of Atka. At 1.20 P.M. the "Lydia" was towed out from the wharf, and, after stowing the boats, set sail with a southerly breeze. A strong south-west sea was encountered outside.

*July 10 to 12.*—With violent head-gales we made very slow progress. A first attempt to reach Bogoslof failed. The mate is prostrate with a strained back, the captain has boils and a wounded hand, and nearly everybody in the cabin is sea-sick. For much of the time the vessel was hove to in fog and rain.

*July 13.*—On going on deck at 3 A.M., I found the ship beating into Makushin Bay with a S.S.E. wind. Overhead was a breaking cloud scud, and there were glorious views of snowy peaks and deep fjords in all directions. The "Lydia" anchored close to the shore in a good harbor at 9.30 A.M. A row of huts on the beach is known as Makushin Village. The place is squalid and the natives unkempt. The "chief," a harmless young man with no mark of administrative power about him, was secured as a "guide" to accompany Myers and Sweeny in a second ascent of Makushin, this time from the south. He said he had been up three times, but the event proved that he had been only to some solfataras at the foot of the moun-

tain, and he came back a wreck from snow-blindness after the experience that the relentless youths of M. I. T. put him through. They succeeded in reaching the summit, exploring new active vents, and obtaining valuable records and photographs.

The remainder of the scientific party, Eakle, Van Dyke, Gummere, and Jaggar, accompanied by the seaman Fred, took the launch to the extreme eastern arm of Makushin Bay, which was named Seeley Bay in honor of Captain George Seeley, master of the "Lydia." Makushin Bay is a deep fjord with four fingering arms, the southern two being forked extensions of the greater arm named Anderson Bay. From the north a group of towering needle rocks jut into the middle of the bay. Near the head of Seeley Bay, at the mouth of a valley on its north shore, camp was set up in the tundra with a large wall tent, the magnetic instrument tent, and a pyramid tent. In the large tent the box stove was used, and both driftwood and coal furnished fuel.

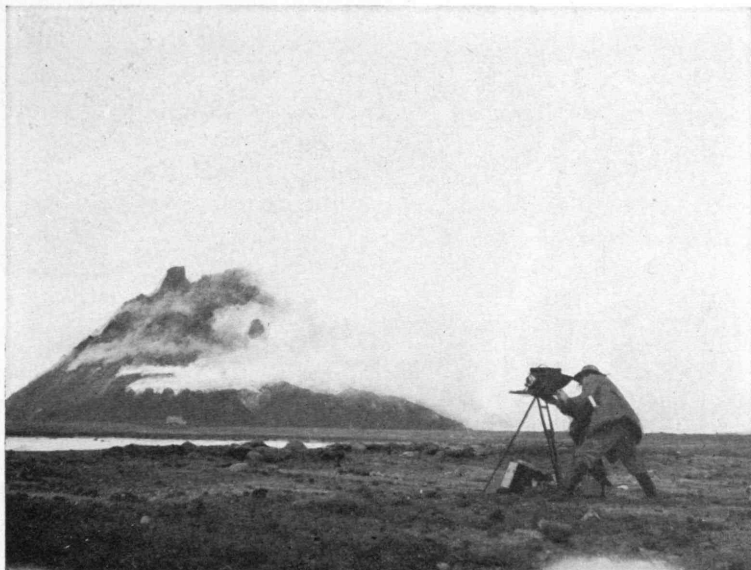
*July 14.*—The day is rainy, but the precious days on land must not be wasted. Gummere set up his instruments, Eakle collected rocks along the shore, the doctor and Jaggar tramped up the valley to the north-east with a view to exploration of the saddle between Makushin Bay and Beaver Inlet. This is a critical place, because it is just on the border line between the supposed northern belt of younger volcanic rocks and the southern belt of crystallines. What these crystallines will turn out to be is becoming an exciting speculation. On the shores of Makushin Bay there are many pebbles of granite. Where do they come from? South-east of the head of Seeley Bay there is a great group of snowy serrate peaks and glaciers, culminating in an impressive mountain not unlike the Dents du Midi at the end of the Lake of Geneva. This mountain we have named after our schooner, "Lydia Peak." These mountains rise to heights of five thousand feet, and in every way are topographically contrasted with the rounded grassy mountains or conical peaks of the north side of Makushin Bay. Makushin is the only important high mountain on the north side, and that is a smooth dome, very different from these alpine tooth-like summits of the south. It is evident that a new rock of some resistant character makes the southern mountain range, and the suspicion that it will prove to be granite or diorite is strong, for it weathers like granite, and granite must be somewhere hereabouts, as shown by the beach pebbles.

Hence it was a matter of keen interest to watch the stream pebbles of the two forks of this Camp Creek. The north fork drains the northern rounded hills, and the south fork drains the critical divide line, with the



beginnings of the serrate range rising from its southern bank. The pebbles in both forks are greenstones, agglomerates, and some slates and quartzitic-looking rocks, but in addition the south fork shows some well-rounded pebbles and boulders of coarse diorite. The abundance of these in the South Fork suggests that this rock occurs in that direction, somewhere near the head-waters of the stream. A study of the southern mountain slope along the lower course of the stream shows this ridge to consist of a heavily bedded volcanic series of strata, aggregating ten thousand feet in thickness, the rocks being tuffs, andesites, and agglomerates. The beds dip 26 degrees N.N.E.; that is, away from the supposed granites of the south, as though tilted back by them or resting on their flanks.

*July 15.*—The day was fine, and the morning was given to photographing Lydia Peak, which is magnificent from our camp ground near the mouth of the creek, and also making photographs of typical groups of flowers and ferns on mossy banks. In the afternoon I went up the spur of the mountain south-east of the camp (that is, the ridge noted yesterday as composed of ten thousand feet of dipping volcanic strata), and quickly startled from their eyrie the usual pair of bald-head eagles and their solemn lone eaglet sitting sullenly on an inaccessible shelf. For any one desirous of collecting eagles and studying their habits, this country should be a paradise. The great series of tuffs is continued through the mountain, and, following the crest, I crossed many dikes of silicious porphyritic rocks, perhaps offshoots from some larger masses of granitoid rock which lie to the south. A charming native of the heights is the snow bunting, always met here as one reaches the snow patches about the fourteen-hundred-foot level, the male bird snow-white with patches of darker color, the female less conspicuous. At this season they are always in pairs. The doctor has found skeletons of small rodents, and I have seen some mole or mouse-like creatures running through the grass. At the foot of Lydia Peak, across Seeley Bay at its head, there is a green lake in a rock basin with waterfalls below it and moraines above it, probably a hundred feet above the salt water and separated from the bay by a low rocky ridge. The Lydia Peak range forms a crescent of glacier-covered mountains around this lake, and a long spur of apparently volcanic rocks extends westward from the lake district to divide Seeley Bay from the next embayment to the south. I hoped, on ascending the mountain to-day, to get a view of the Pacific through a supposedly low pass north of Lydia Peak, but the pass proved to be a high snow-covered ridge, with another obstructing high peak north of it. On going two or three miles to the east along the summit, I secured a good view of Beaver Inlet and



McCULLOCH PEAK, BOGOSLOF, LOOKING NORTH-WEST



SHALER MOUNTAINS, UNALASKA, FROM MAKUSHIN VILLAGE



NAZAN BAY, ATKA, FROM NAZAN VILLAGE, LOOKING EAST  
*New Bara-bara* in Foreground



AGED ATKAN WOMAN WEAVING MATTING

the whole range of mountains in the peninsula which bounds that inlet on the south for twenty miles. These mountains are not like the serrate glacial range south of me, but are lower, pyramidal or hilly, and look as though they might be the same ancient volcanic rocks as this ridge. There are some beautiful deltas built out at the mouths of streams which enter Beaver Inlet. The whole pass through from Seeley Bay to Beaver Inlet is only six or seven miles long. The doctor turned up on the mountain slope near the head of the pass, and together we dropped down a steep gulch to return to camp by the valley. Van Dyke tried a rock slope and had a narrow escape from falling while crossing the face of a very steep cliff, while I went down the ice in the gulch, taking chances of going through it to the torrent below or of glissading. We came out all right by a narrow margin. We returned to camp without having found the granite in place, but convinced that it was not far to seek.

*July 16.*—Eakle's work at this point along the shore has revealed quartzitic rocks full of mineralization which strongly suggest the proximity of a granite contact zone. Everything leads to the supposition that granitic rocks ought to be found, if we go south. Accordingly, we broke camp in a disagreeable drizzle, which lasted all day, embarked in the launch and skirted the south shore until we reached the south-west arm of Anderson Bay, and were right under the cliffs of the serrate mountain range. True enough, it proved to be a massive granite, passing into diorite along its contact zones. The great platy joint surfaces of the cliffs suggest Norway or the Yosemite. The valleys are U-shaped, carved by glaciers, and glaciers still rest in the amphitheatres at their heads. The secret of the high mountain range was revealed, and this range was named the Shaler Mountains after the late honored Professor Nathaniel Southgate Shaler. The granite contains pink veins of aplite, it varies to very coarse mineral aggregates, is rich in quartz, and, if we found it in the Sierra Nevada, we would suppose it to be of Mesozoic age. It seems, however, to cut the volcanic series. Is it possible that the thick series of volcanics studied on Seeley Bay are Jurassic? No fossils were found, but the rocks are so fresh and "young," looking from a geologist's standpoint that one would suppose them to be Tertiary. If so, can such a coarse massive granite be supposed to be intrusive into Tertiary rocks? That is, be still younger yet? The granite is still a puzzle. The granite was found to extend northward to the mouth of Anderson Bay. Here, on one of several granitic islands in the bay, there are thousands of sea-birds nesting, protected from the voracious foxes of the mainland. We saw a big red fox running along the shore, for some

time unabashed by the chug-chug of our motor. Among the birds are puffins, gulls, guillemots, cormorants, and divers. We ran back to the schooner off Makushin Village. The Makushin party had returned, both Sweeny and the guide suffering somewhat from snow-blindness. The mate's back was well again, and the cutter "McCulloch" lay at anchor in the harbor. She had made the run to Attu and back, and had a report of Bogoslof, where a new steaming cone in the midst of a continuous stretch of beach and bar had risen from the sea in the last twelvemonth, filling a space where seven fathoms of water had been.

*July 17 to July 23.*—Starting from Makushin at 11 A.M., July 17, we sailed west, intending to make a reported anchorage in Inanudak Bay, Umnak. The slopes of Cape Tanak and northern Umnak are long, gently sloping, and green, with brown lava fields. All day long, July 18, Bogoslof was in view to the north, the northern rock flat-topped, the middle ones steaming hard, the southern high with a sharp horn at its north end. The weather is cold, between 40 degrees and 50 degrees Fahrenheit. In the evenings violent arguments engrossed attention, covering the whole range of human thought from theology to microbes. These discussions are among the pleasantest memories of the voyage, and on no occasion was there a serious jarring note to interrupt the good fellowship of the six men huddled for four months in a cabin twelve feet square. The cabin was heated and dried by lighting one of the "Primus" oil stoves. On July 20 we made Inanudak Bay under lowering clouds and a south-west wind. The wind literally followed the shore, and there was no shelter to be found. The captain grimly gave the word to "get off the beach," and we ruefully saw the unexplored land recede astern. With a S.W. gale and no hope of progress on our course, one sailor ill and others suffering from lacerated and infected hands, water supply short, a choppy sea, and Attu as far off as ever, it was a time to try men's souls. The doctor has a daily surgical session in the cabin, washing and dressing various small injuries. The only observation obtained in these days was a sight on two high snowy peaks, July 22, far to the south-east, probably in the Four Mountains.

*July 24.*—Fog and W.S.W. gale continue. I looked over the chart with the captain, and noted that according to his reckoning, after all these days without land or sun for guidance, we should make the coast of Atka or Amlia this afternoon or evening, unless unknown currents have taken us a long way off the course. At 5 P.M. we were scudding along on the starboard tack, when land was called by the watch, and there, right over the bow, close at hand, coming out of the fog, was the long slope of a volcano with a rocky



headland below. The schooner was put about and headed N.W. on the port tack, and later in the night headed S.E., so as to be off Amlia in the morning. The land sighted was the north head of Atka, east of Korovinski Volcano, and we were just seven miles off the captain's reckoning, after sixty hours without an observation amid strong unknown currents. This was only one of many illustrations of Captain Seeley's careful seamanship.

*Thursday, July 25.*—At dawn the "Lydia" was off the north coast of Amlia, beating towards Nazan Bay, Atka, under a north-west wind and gradually clearing skies. For once the fog had lifted and revealed the long mountainous profile of Amlia, rugged, but not very high or snow-covered, and recalling the mountains of Tigalda or the range south of Beaver Inlet, Unalaska; that is, the old volcanic series. In sharp contrast to the southern belt, of which Amlia is a part, the mountains of northern Atka rise as great snow-clad cones and glaciated peaks, reaching heights of from three to five thousand feet. These, as in Unalaska, are largely active volcanoes, of which Korovinski is the highest, and occupy a northern peninsula separated from the elongate east-west southern range by Nazan Bay on the east and Korovinski Bay on the west. Amlia, separated from Atka by a narrow pass where "furious currents" run (quoted from the chart), is really an eastward extension of southern Atka, and the two together are about one hundred miles long. After some delay occasioned by lack of wind when the lee of the land was reached, the vessel made harbor in Nazan Bay, behind a group of islands, at 11.30 A.M. We were close to a cove, where is the little village of sod huts and frame houses that contains the whole population of Atka, one hundred and ten souls. Said population trooped up to the top of a hill close to the water, and gazed, open-mouthed, at the strange sight of an unknown schooner making harbor there. It is for them one of the epoch-making events.

The scientific corps at once set to work preparing for inland expeditions—Myers and Jagger to go northward, and Eakle, Gummere, Van Dyke, and Sweeny south to the Pacific Coast. In the afternoon both expeditions started, Dr. Eakle's party making camp on the shore south of the Nazan group of islands, near a waterfall which is conspicuous from the bay. They afterwards made journeys inland and across the island, and found a basaltic volcanic series of ancient rocks, but no sign of granite or diorite. Professor Gummere established a magnetic station, and Dr. Van Dyke collected quantities of plants and insects.

Two sailors landed the northern party on the black sand beach two miles north of the village, and we donned our packs and headed towards snowy



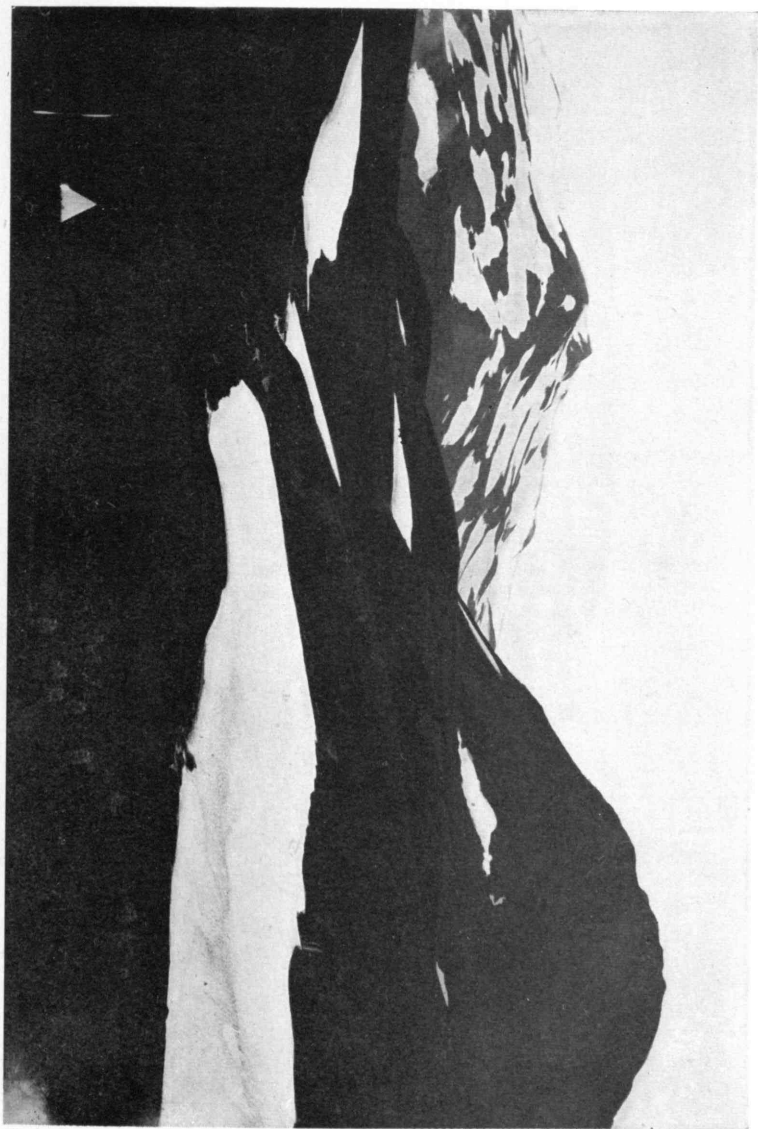
peaks at the head of a grassy valley. Camp was made on high terraces beside a strong glacial stream, in full view of Nazan Bay dotted with islands and Amlia Pass beyond. The "furious currents" of the pass are marked by lines of white foam, and the bay is full of sunken rocks, plainly visible from this height.

*July 26.*—There was rain in the night. We explored the peculiar terraces beside this stream and the amphitheatre at its head, where a low steep conical hill rises, surrounded by a semicircle of high mountains. The semicircle opens southward towards the bay. There is a cold north-west wind blowing: it is a half-clear day with clouds on the mountains. The view towards the bay discloses a succession of hummocky and half-grassed sea-walls of black sand back from the water front, suggesting uplift of the lowland which separates Korovinski and Nazan Bays. This lowland is occupied by eight shallow lakes. The peculiarity of the terraces of the stream by our camp is that they have no flat top, but a wavy upper surface, and, when examined in section, consist of more or less angular bowlders and gravel with no marked bedding. This deposit has been trenched to depths up to fifty feet by the streams. The thing suggests some sort of tumultuous flood deposit, but whether it is glacial or volcanic, or both, as in the ice floods on the volcanoes of Iceland, does not yet appear. The mountains about this amphitheatre are clearly volcanic, and the whole semicircle with conical hill in the midst strongly suggests an eroded crater. On the west the mountain wall is jagged and grotesque; on the north are two high snowy crests, one a smooth dome, the other serrate; on the east are conical peaks. We crossed a columnar basalt flow, which shows in fine palisades on the north shore of the bay to the south, and climbed the conical hill. This hill proved to be a mesh of dikes of volcanic rock, and may well mark the site of conduits under a crater. Some bread-crust bombs were seen lying about. It is connected by a low saddle with the northern mountain. Moraines occupy the upland basins at the sides of the conical hill, and glacier remnants showing some crevasses appear under the high snows. We found a ptarmigan chick in the grass and saw the old bird. The long sedges and flowering plants are even more profuse than in Unalaska. The doctor afterwards reported that he found the boreal types of flowers at lower levels on Atka.

*July 27.*—We have named the white dome Mount Niles in honor of the distinguished Professor Emeritus of the Institute, and the serrate peak Mount Crosby after Professor William Otis Crosby. The western peak, with its outline of gnomes and goblins against the sky, we call Hoodoo



MOUNT NILES, AITKA, LOOKING NORTH





MOUNT CROSBY, ATKA, LOOKING EAST

Mountain. A pass across the mountains at the head of this valley appears doubtful, hence to-day's programme is to move camp westward around the south base of Hoodoo Mountain. We photographed the terraces on the way, it being a fine day, and then ploddingly trudged at a high level until we came to the south side of a deep and broad flat-bottomed valley which empties its milky river into Korovinski Bay. A fine view was obtained of this bay, bordered with high cliffs on the north and many rocky coves on the south. Some of the rocks on the points of land jut out of the water like leaning towers. One of them resembles a porpoise standing upright on his tail. We could see all the three headlands to Cape Kigun, the south-west point of Atka, and their alignment intersected the north shore of the bay below us at a very different point from the one indicated on the chart. It is a wonder, however, that the charts of these islands are as good as they are in view of the difficulties of navigation and the length of time it would take to make good maps in waters where it is always foggy.

The Milky River, to give it a name, heads on the west end of Mount Crosby and flows west to the north shore of Korovinski Bay, about eight miles. North of the valley there is a steep cliff, and then comes a broad upland plateau, surrounded by mountains. The western mountains are divided by a narrow fjord, Korovinski Harbor, trending N.-S. East of the plateau Mount Niles towers directly above the Milky River valley near the head of the river. Mount Niles is on the north side of the valley, and, to ascend it, we have before us the prospect of descent a thousand feet to the flat valley bottom and up four (?) thousand on the opposite side. During the day the clouds on this mountain and a still higher pure white dome beyond opened and shut, making wonderful alpine effects. The farther dome is probably Kluchovski Volcano, shown on the old charts.

We travelled on the high south slope eastward up the Milky valley until the wall became too steep for further progress. The valley narrowed to a box canyon cut in horizontal basalt flows. Above us the crags of the north side of Hoodoo Mountain rose into the clouds. Ahead, as we rounded the point of a spur, were seen the ice cataracts of three glaciers descending from Mount Crosby. These glaciers are the head-waters of Milky River. Below us vertical precipices overhung the torrent. We made camp for the night in an upland basin on a grassy flat among the snow patches, with cold snow water babbling by. The same lignite or peat, interbedded with mud and sand, was found on the walls of the rill trenches here as on the Sugarloaf plateau in Unalaska. As this basin is on the same level with the broad plateau across the valley to the north, it is probable these high level plateaus

are all floored with tundra sections showing lignite. It is a matter of interest to know whether the plants making the carbonized layers are identical with the modern grasses or are of Tertiary age. If they are Tertiary, then these plateaus at the thousand-foot level mark an uplift common to both Unalaska and Atka since that period, supposing the surface to represent an old flood-plain. The Milky River valley shows no evidence below the plateau level of terracing and none of the irregular terrace phenomena noted at the first camp in the northern valley.

*July 28.*—We broke camp and moved down very steep slopes, sliding, rolling, and tumbling, to the valley bottom. Forging the stream was a matter of some difficulty, and above boot-tops. The weather holds fairly good with only occasional rains. The valley walls are horizontal beds of coarse volcanic agglomerate alternating with basalt flows. We cached specimen collections, and everything which we could spare, in the grass by the river, and with lighter packs climbed an oblique slope to a high basin, where a new camp was made under the snows of Mount Niles. On the snowy ridge above this point we saw steam yesterday from across the valley, and we are making for that steam. The basin is open to the south towards the valley, and there is a cavern in the rocks above a slide-rock slope just above the camp to the east. Just before starting up the north cliff, while we were below, the clouds cleared away from Mount Crosby to the east at the source of Milky River, and gave opportunity for a most picturesque photograph. The mountain is exactly at the head of the valley, and from this side is less serrate and more snowy than when seen from the Nazan Bay side. Its height, like that of Mount Niles, is probably near four thousand feet. Two new geological features of interest were discovered in the high basin: there was fresh volcanic cinder on the surface of the snow patches, and Myers discovered outcrops of slate just above the camp ground. The cinder means that some volcano hereabouts, probably either Kluchovski or Korovinski, is actively exploding. The slate is incomprehensible among these lavas: it is either a tuff which has been compacted to appear like slate or else one must suppose a huge block of some deeper ancient rock has been vomited up or carried in a lava flow to its present position.

While we were seated in the open tent, preparing supper, a coal-black fox with a silver-white tail came trotting along across the tundra and down the little gulch at our feet. He was a beautiful creature, his immense bush held straight out and gently waving from side to side, two-thirds of it, from the tip inward, being snow-white, the rest black with a sharp transition line. No white showed on his body, though there may have been a

white patch under his throat. The pilot afterwards told us that there are no black foxes on Atka, and that what we saw was a blue fox. This I doubt, for the white tail and coal-black color are not characteristics of the blue fox. We afterwards regretted that we did not shoot him to settle the point. He saw us, bounded up a nearly vertical bank of peat and sod, and then made for the snows, trotting across the white patches, stopping and turning about to gaze at us, then going on up among the rocks, again stopping, and again loping with a curious awkward but effective trot across another snow patch until he disappeared behind projecting crags. The fur of such animals is of no value in the summer season.

*July 29.*—It was supposed, when we selected this basin as a camp ground, protected on the west, that it would be shielded from the prevailing south-west or north-west gales. Hence our disgust this morning to find fog and rain coming in from the south. The clouds are over everything, and it is raining steadily. We drove in an extra peg to windward, and lashed the peak of the tent with a guy-rope, piling heavy stones on the peg. Then we made ourselves as rain-proof as possible, and started up the mountain with a lingering hope that it might clear at noon and allow us to make the ascent of either Kluchovski or Mount Niles and find a crater. We soon discovered snow patches in the brooks which showed an arch of snow over the water, and some with caved-in portions. This suggested that this water was warmer than common at its source. It did not feel particularly warm to the hand. On ascending one of these brooks, the broken down snow patches became more frequent, until they were open gorges with snow banks on either hand. Then steam appeared rising from the bare rocky heath, and the source of the warm water was discovered. Over a tract an acre in extent there were yellow, brown, and red discolored patches of decomposed rock with steam rising through the crevices, and in the midst of a tumble of ledges and boulders was a pool of clear water, boiling hot, and in ebullition in places. This pool was oval in plan and thirty by twenty-five feet in dimensions. Here and there among the solfataras were little "paint pots" of boiling mud, pearl-gray or brown, with sulphur about the margins. There was some odor of sulphurous acid in the vapors. The boiling pool had no very pronounced taste. The cold wind and beating rain made any lingering to take notes bitterly cold work. A few photographs were made in the rain. Then we selected a place on the border of the hot pool where steam rose through the rocks, and sat down to eat luncheon in a steam bath. The warmth was very grateful in contrast to the cold wetness of everything else, for we were already soaked to the skin. The rocks of this mountain,

except for the slate noted, are basaltic agglomerates and lavas, and there is little doubt from its form, coupled with this occurrence of hot solfataras on its flank, that Mount Niles is a volcano, and probably there is a crater somewhere above us. But there is no use in going higher in such a storm and dense fog. We returned to the tent wet, but not discouraged, determined to put in another night in the hope that the weather would change and give opportunity on the morrow for an ascent of the mountain. The wind appears to be more south-easterly, and we find our little silk tent rocking violently, exposed to every gust. An investigation of the larder revealed the fact that the hardtack was almost gone, the kerosene for the "Primus" stove would serve for another morning's coffee and no more, and the dried beef is becoming so hard—it was cut too thick in the first place—that it is difficult to swallow. In fact, this cold diet, coupled with constant wetness, is beginning with me to produce a form of dyspepsia which is unpleasant, a sort of stopped-up-throat feeling with little knives going through my chest and back. The dried California figs do not swallow any too readily.

We reinforced the guy-rope, and in the middle of the afternoon crept into our sleeping-bags to save kerosene and try to keep warm. Every now and then one of the iron tent-pegs would pull up and the silk begin to flap and thrash. Then one or the other of us would have to crawl out, get wet all over again, drive the peg in and pile stones on it. The storm increased during the night, and the bamboo tent-pole had to be nursed by various devices in order to keep it upright. Finally there was heard a suppressed imprecation from Myers anent his "Johnson" bag, which up to that time had been defended against all comers as wondrously convenient, *water-proof*, and warm. It was on the windward side of the tent, and there was a pool of water inside of it. Myers had used up his entire reserve of clothing, and at this stage had no dry nether garments of any sort. I had one woollen undershirt left, and loaned him that, and it was promptly converted into a "universal" suit. It would be difficult to devise a more completely miserable situation than was that of the two forlorn occupants of that little silk cone through the long, stormy, wet, sleepless night, baffled, hungry, midway between America and Asia, between the Arctic and the mid-Pacific, between earth and sky, and far from any warmth or any base of supplies.

*July 30.*—At the first gray of daylight, the tent a wreck, the storm unabated, driving, cold, we made a cupful of coffee with difficulty, and broke camp. There was no use in waiting longer for a break in the storm. Several streams to ford were between us and the schooner, the rain was increasing their volume, and we were without food, fire, or effective shelter.



Besides, there were signs of exhaustion and chill beginning to appear in both of us, and the route back to the schooner was over miles of *terra incognita*, largely swampy hummock-grass. Therefore I gave the word to pull up stakes and make for Nazan at any cost. The one thing to do was to keep going so as to hold the blood in circulation, and at the river cache there was a small supply of food. The kerosene was exhausted. At 3.30 A.M. we left the "Black Fox Camp" and plunged down the mountain amid sheets of driving rain over wet and slippery grass. The quality of that grass, when wet, we had to learn by another experience. Coming to a steep slope with a little grassy platform at its base, and beyond that a gorge with a torrent, I led the way by sliding down the slope in a sitting posture after the fashion so effectually demonstrated in Sweeny's company at the mouth of Glacier River, July 6. Myers was following close behind. We thought to stop on the flat platform below, but had not figured on the slippery wet grass. Instead of stopping, my body shot across the bench like a toboggan, and into the gorge beyond. Myers did the same, and with a yell of warning came hurtling through the air plumb on top of me, and we sprawled in a heap at the side of the brook. Fortunately, the gulch proved to be only ten or twelve feet deep, and we landed in a pool of water without striking any rocks, and Myers landed without striking me with his boot, so that no bones were broken and we had "discovered" a new quality in this wonderful basket-making grass for which Atka is so famous.

We reached the cache at the ford of Milky River, and had "luncheon" there at 7.30 A.M. The ford was made without accident, but we did not attempt to take up the specimens at the cache,—we were too heavily laden as it was. We tramped down the south side of Milky valley to the shore of Korovinski Bay, noting a double sandy sea-wall back of the beach, forty feet high, similar to the walls on Nazan Bay, but not so many times repeated from the beach inland. The shore of Korovinski Bay was followed for two or three miles eastward,—we were no longer capable of judging distances. Then we cut inland in order to cross the low lake district to Nazan Bay. Here difficulties came thick and fast. Packs were becoming insupportable, the grass was like wet mattresses and induced repeated falls, a narrow stream had to be forded, and it proved more than waist-deep and very cold. Beyond the stream came hills, and the topography appeared different from what was expected in the lake country. Eastward by compass,—on and on,—and now we hold a council of war. The wind and sleety rain are beating in our faces, and the weight of the packs is intolerable. It is all we can do to drag ourselves in this tumble of deep grass. We make careful note of



the landmarks, and drop our packs—camera, precious note-books, everything—and struggle to the crest of a neighboring ridge to get a view. The making of this last cache seems to be the signal for a change in luck. Just over the ridge was the large lake, and across it could be seen the native trail which leads from Nazan to the dam and salmon stream at the outlet,—the deep stream we had forded. We did not know this trail at the time, however, but we knew the lake, and waded in the shallow water up its north shore, finding the lake bottom preferable to the hummocks. At the east end a trail was found and followed eastward, passing other lakes, until we reached the black sand beach on Nazan Bay. It was then merely a work of grim trudging, with muscles almost played out, hands numb, and flesh white with incessant wetting, to carry us south along the beach and over the hill to the village. We reached Nazan about noon, roused William Dirks, the son of Captain Henry Dirks and local storekeeper, and borrowed his skiff to row out to the “Lydia.” Never did brick mansion look so home-like to wanderers as the little cabin of the schooner, with the good captain, Dr. Van Dyke, and Professor Gummere to greet us, and the old Norse cook grinning out of the porthole in his warm galley whence rose coal smoke! In her snug harbor the vessel was absolutely protected from the storm which continued to howl outside. Our friends said that our appearance was memorable, and that we “looked just about all in,” in the vernacular of the times. After a bite of hot food we turned into our berths and slept the sleep of the blissful.

*July 31.*—After another night of storm the weather begins to show signs of clearing. Eakle and Sweeny returned in the morning from the southern camp. In the afternoon Eakle, Dr. Van Dyke, Gummere, and Jaggard went across country to the large lake to recover the note-books, camera, and packs left at the last cache made by the storm-driven northern party. Going by the south side of the lake, a native trail was found in the grass most of the way. On the return, laden with one of the packs, I stepped from a higher to a lower hummock on the steep hillside overhanging the lake without perceiving that beside the lower hummock was a deep hole. The result was a sprawl at full length in the shallow water below. On the return we passed over the remarkable succession of sea-walls back of the beach at the head of Nazan Bay. There are six walls, the back one thirty feet above sea-level, the front one twenty feet. The back one is one-third mile from the shore, and each wall is about a mile long. They consist of black sand, the remoter walls being more heavily clothed with dense grass than the front ones. There is a broad swamp and some ponds back of the

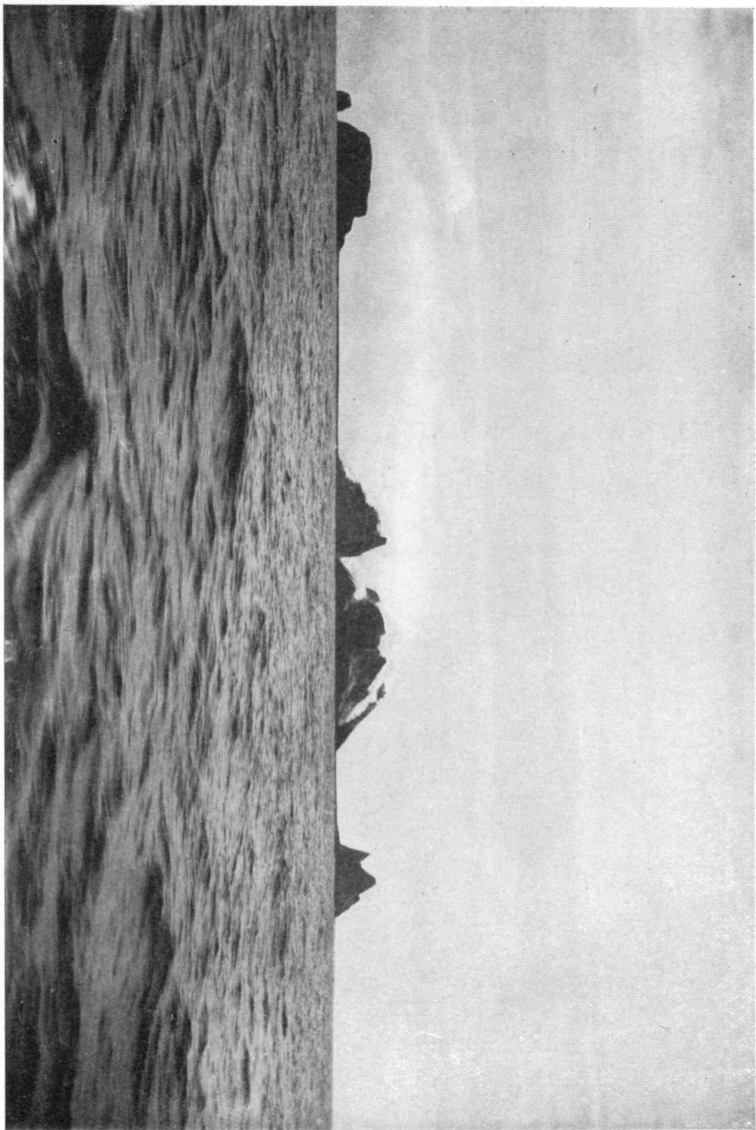
wall farthest from the beach. At either end the walls, like the present beach, are terminated by rocky hills. Apparently, they have been formed by elevation of the coast, which has brought to relatively lower levels the zone where the storm waves of flood-tide hurl up a sand barrier.

*August 1.*—Myers and Sweeny departed early to return to the river cache and recover the specimens which we left there. They returned at one o'clock. Eakle and Gummere made an official call on William Dirks, the storekeeper, and brought him on board the schooner. I presented him with a cheese. With the aid of Mr. Dirks, and also of Gardner, the pilot, a number of baskets have been secured for the party from the native women. The natives of Atka are a sturdy lot, and appear in much better health than those seen in Unalaska. Their bidarkas are wonderfully well made, and, when laced into the hood in the middle of one of these skin canoes, the intrepid Aleutian hunters propel themselves fearlessly with double-ended paddles out into the open sea from one island to the next. They will face the tide-rips and heavy storm waves of Bering Sea in these shells, and are prepared, if they turn over, to roll, aided by the paddle, back to an upright position. The bidarka is decked with sea-lion skin, the hood keeps water out about the hole where the paddler sits, and he is usually clad in the kamlieka, or seal-bladder shirt, which, laced about the neck, is an effectual waterproof garment. A crowd of native men came on board to purchase staples in small quantities from the ship's stores, such as tea, sugar, flour, tobacco, knives, cartridges, and shirts. Their purchasing medium is coin, chiefly half-dollars and quarters. They know nothing of bills, and small change requires much explanation. We entertained them in the cabin with the phonograph and legerdemain. The men were amused, but in no way evinced extraordinary astonishment. Through the visits of revenue cutters and other vessels they have seen enough of the outside world to become fairly civilized. The prevailing costume consists of a small cap, jumpers, and blue jeans. The natives appear like Indians, but here and there the eyes have the Mongolian habit. There is a large admixture of Russian blood, so that a full-blooded Aleut is rare. The women are the basket-makers, and are very industrious. The grass is collected, assorted, and dried in bunches. It is stripped and split for the finer work. It takes a year or more to dry a bunch to the right tone for fine basketry. The climate is so wet that great care has to be exercised to prevent the grass from rotting. The baskets are woven free-hand with the simplest possible apparatus: thus a lard-pail turned bottom up on a stool and wrapped with two or three layers of newspaper will serve as mould for a medium-sized

basket. With such an apparatus the weaver sits on the floor beside it, and, starting the bottom of the basket with radial grasses on the middle of the bottom of the inverted lard-pail, she rapidly weaves a concentric woof of grass, turning the basket around in the process. From time to time, as her copy may demand, she places a bit of silk or worsted among the strands, and it takes its place in the pattern with miraculous effect. The women are paid from two to eight dollars by the traders for baskets which sell to collectors in the abodes of civilization for from twenty-five to a hundred dollars. The finer work, which generally takes the form of belts, telescopic card-cases, or bottle covers, is unrivalled for delicacy of weave and design, by any other basketry in the world. These poor women have no notion that their work is world-famous, and they present an extraordinary example of island isolation developing in a tiny community a unique industry, furthered somewhat, doubtless, by the peculiarities of the native grass. Children of all ages from five years on show proficiency in basket-making, but of skilled adult workers there are probably not more than twenty-five or thirty in the community.

*August 2 to August 6.*—Another day was spent at Nazan, photographing the natives and their cleverly constructed houses and equipments. A gift of one hundred pounds of flour was sent to the chief, and at 9.30 on the morning of the 3d the "Lydia" sailed, east-bound. With south-west winds the voyage eastward was uneventful. Fine views were obtained of Korovinski and Kluchovski volcanoes in northern Atka, and of Seguam, an island volcano lying next east to Atka. Seguam in 1892 was violently active, so that its eruption was seen from Nazan Bay and the sky was darkened by the ash. On the 4th and 5th good progress was made, but fog again prevented a visit to the harborless islands of the Four Mountains and other points between Atka and Umnak. On Tuesday, the 6th, Umnak was sighted at 8 A.M., and preparations were made for a vigorous investigation of Bogoslof in the hope of fine weather there.

*Wednesday, August 7.*—At 6 A.M. Bogoslof was in full view ahead, the weather fair, a steady south-west wind blowing. It was determined to land two dories and have the vessel stand off, while three or four hours, if possible, were spent in examination of the island. The landing was made at 10.30. Hundreds of immense sea-lions, bellowing with voices that well justify their name, swam within a stone's throw of the dories, when they would raise themselves high in the water, stare, and then plunge frantically beneath the waves. When we landed on the beach, most of the animals there had floundered into the water; but one immense bull re-



BOGOSLOF, LOOKING EAST. AUGUST 7, 1907

Fire Island

Metcalf

McCulloch

Old Bogoslof



METCALF CONE AND ITS SPINE, BOGOSLOF FROM FIRE ISLAND



MURRES, CHICKS AND EGGS, FIRE ISLAND, BOGOSLOF.

mained, apparently asleep. One of the party ran toward him with a camera, the monster awoke, and with awkward gait floundered toward the sea, but did not make his escape until several snap-shots had been secured.

The hours spent on Bogoslof were the most interesting of the whole trip. The rocky cliffs are covered with millions of birds, their eggs and their chicks, chiefly murre. On startling them from the face of the cliff of old Bogoslof, the southernmost rock of the group, the swarm of winged creatures literally darkened the air. To members of the party climbing among the rocks the stench from offal and decayed eggs was intense. The island consists of four prominent peaks, old Bogoslof at the south, McCulloch Peak steaming actively in the middle, Metcalf Cone (sometimes called Perry Peak) adjacent to McCulloch on the north, and New Bogoslof, or Fire Island ("Grewingk"), a flat table rock at the north-west end of the group. These are now all connected by continuous gravel and sand strips where in one place there was a broad channel and seven fathoms of water a year ago. Around the base of McCulloch Peak is a lagoon of hot salt water, steaming quietly and yellow with iron-stained mud. McCulloch Peak was 450 feet high at the time of our visit, conical in outline, with great lumps or horns of what appeared to be ledge rock jutting out from the upper slopes, and straight talus of boulders all around the base, inclined at 30 degrees. The entire mass is steaming from many fissures, and in places there are bright yellow sulphur coatings at the steam vents. Metcalf Cone on the north side is really a half-cone, the south side being broken down to form McCulloch Peak. This rupture has left Metcalf with a vertical precipice on the McCulloch side and a cone slope still steaming on the north side. Neither Fire Island on the north nor old Bogoslof on the south is active at present. The steep cliff of Metcalf reveals in cross section a great horn of congealed lava, which has risen into the midst of the cone with a smooth curved surface toward the west, and at the top a broken vertical surface toward the east. Seen from the north, this horn looks like a shark's fin; seen from the west, like the horn of a rhinoceros. It is apparently the product of a mechanism identical with that which produced the extraordinary spine on Mont Pelée. This process is further elucidated by McCulloch Peak, its protuberances and its history. McCulloch Peak and Metcalf Cone are both products of the slow pushing up from beneath the waves of a mass of refractory lava, semi-solid, crusting and breaking into blocks as it rises, with only the central portions retaining a semblance of fluidity. The horns are doubtless such central portions.

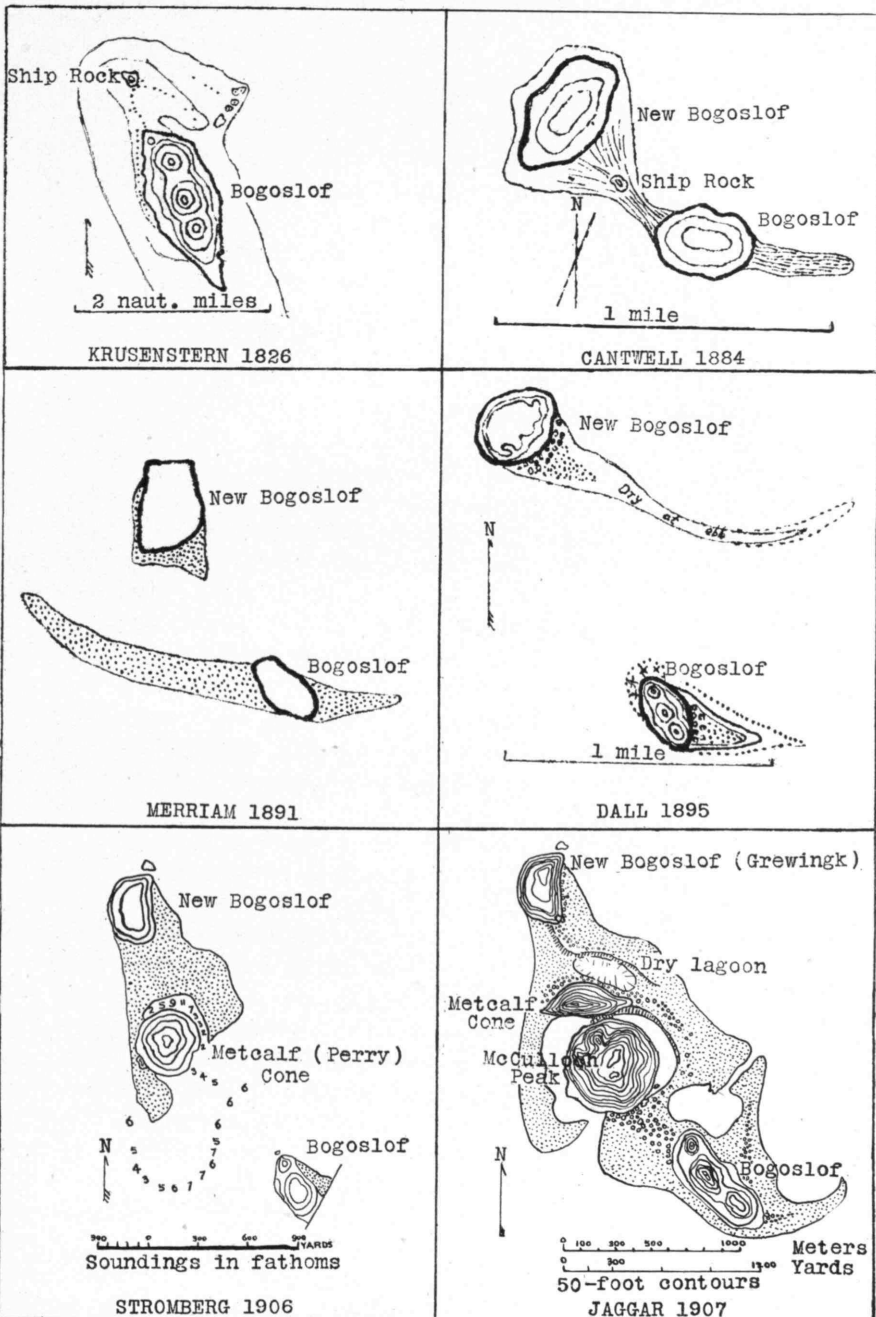


The history of Bogoslof is epitomized in the accompanying six sketch maps. In 1796 old Bogoslof rose. In 1884 New Bogoslof (Fire Island) came into being, and the waves joined the two with bars. In the '90s open channels with probably ten fathoms of water were maintained between the islands and the sand spits changed their shapes. In 1891 New Bogoslof was still steaming. Between 1891 and 1895 New Bogoslof changed its form from a large irregular cone to a smaller flat-topped table. I believe this change was due (1) to its being levelled by the waves and covered with beach deposits, (2) to its being subsequently uplifted. Beach boulders and sands can now be seen on its flat top and in section at the edge of the cliffs. In May, 1906, Metcalf Cone was reported by the "Albatross" midway between the old and New Bogoslofs. Lieutenant Stromberg, of the revenue cutter "Perry," in July, 1906, made a sketch map showing Metcalf Cone attached to New Bogoslof, but separated by seven fathoms of water from old Bogoslof. The revenue cutter "McCulloch" in July, 1907, found that Metcalf Cone had broken in two, extending itself into McCulloch Peak on the south, and that the waves had again cemented the breach between the islands with continuous land. When we reached the scene, conditions were as shown on the last map. But the end was not yet. On September 1, after we had left the islands, McCulloch Peak exploded, sand and dust fell one hundred miles to the eastward, and a visit by the revenue cutter in October revealed a watery lagoon at the south base of the Metcalf remnant, McCulloch Peak was gone, and all of the rocks were shrouded in a heavy mantle of volcanic débris. No such extraordinary story of the growth and alteration of an island in the sea in a history that has lasted one hundred and eleven years has ever been told in the records of science before, and the changes of the last sixteen months are unique in the annals of volcanology.

In the afternoon the landing parties returned to the ship, and a quick run was made with a fair wind to Makushin Harbor, arriving there at 8.15 P.M.

*August 8 to 12.*—During this period a camp was made at the head of the south-east arm of Anderson Bay with a view to more thorough exploration of the Shaler Mountains. Van Dyke and Sweeny climbed to the summit of the range, and discovered glaciers, a high mountain lake in a granite rock basin, and waterfalls tumbling from hanging valleys. Dr. Eakle explored the northern contact of the granite, and found it changing to diorite and unquestionably intrusive into the volcanic rocks. Gummere and Jaggar made a topographical survey of a remarkable series of elevated sea benches on the north side of the mountains. These benches extend along the walls of Anderson Bay, pitching downward to the north from an elevation of 415





MAPS OF BOGOSLOF VOLCANO, SHOWING GROWTH AND  
CHANGES FROM 1826 TO 1907

feet at the southern end of the bay, at such an angle that they would intersect the tide-water plane in a distance of eight or ten miles. This means that the centre of elevation whence they are tilted northward lies in the Shaler Mountains. That their original position was horizontal and at sea-level is clearly evidenced by the beach sand and well-rounded sea-worn bowlders still to be found strewn along the granite bench. This bench the quartz-laden waves at one time carved into the mountain's face. Unalaska is an earthquake land rapidly warping above the sea, and it is by small differential jerks that the granite range has been upheaved and the old shore lines tilted.

On Monday, the 12th, we sailed for Dutch Harbor, became becalmed in the rain during the evening, but later were favored by a strong breeze.

*August 13 to 19.*—On the morning of the 13th the expedition arrived at Dutch Harbor at 9.30. The following six days were occupied with repairs to the schooner preparatory to the voyage south and with securing information, statistical and otherwise, from the residents of Unalaska concerning many points which the western trip had rendered of interest.

Professor Eakle and Mr. Myers decided to take the sealing steamer "Homer," now due from the Pribilof Islands, bound for San Francisco. Accordingly, the remainder of the party regretfully took leave of them at Dutch Harbor; and at 7 P.M. on Monday, August 19, the "Lydia" set sail, bound east.

*August 20-23.*—After making a heavy night of it with a west gale, we anchored in Akutan Harbor at noon. Akutan is our last stopping-place. The harbor is at the south-east end of the island, and the active volcano unfortunately at the north end; but it was the hope of the party that by crossing the island and making one camp we might visit the crater. Here, again, all hopes were doomed to disappointment, owing to storm. The first day the wind blew so hard that Fred, one of the sailors, was blown away from the schooner in a dory, and could do nothing against the wind. We sent three men after him with the other dory, and even with such a force they were obliged to pull to land and work the boats up the shoal water of the shore until they were to windward of the schooner before they could venture out to return. All of this was *in a barbor*. Our anchor dragged considerably. Gardner, the pilot, was paid off and landed at this port. He did good service and had proved very useful in the islands.

On the second day, Wednesday, August 21, Van Dyke, Gummere, Sweeny, and the writer donned oilskins, braved the storm, and trudged across to Hot Springs Bay and Salmon River north of Akutan Harbor. Hot springs

were found in a valley bottom. The island consists of basalt and basic agglomerates. Some remarkable volcanic amphitheatres and cliff sections were seen. Salmon were found, in the river named for them, in such abundance that we speared them with geological pick hammers and sheath knives, and in some instances threw them out on the bank of the stream from the rippled shallows with our hands. They were poor food, with white flesh, and many of them diseased. The high mountains were all in clouds, cold rain fell, and it was useless to try to make the volcano.

The next day the storm continued unabated. Our time limit is up, and therefore the dories were taken inboard. The mountains are buried in clouds, so that it would be useless to make any further attempt to reach the crater. On shore there was an earthquake shock on this day, August 22, between 8 and 9 P.M. The thermometer here varies from 45 degrees to 48 degrees Fahrenheit.

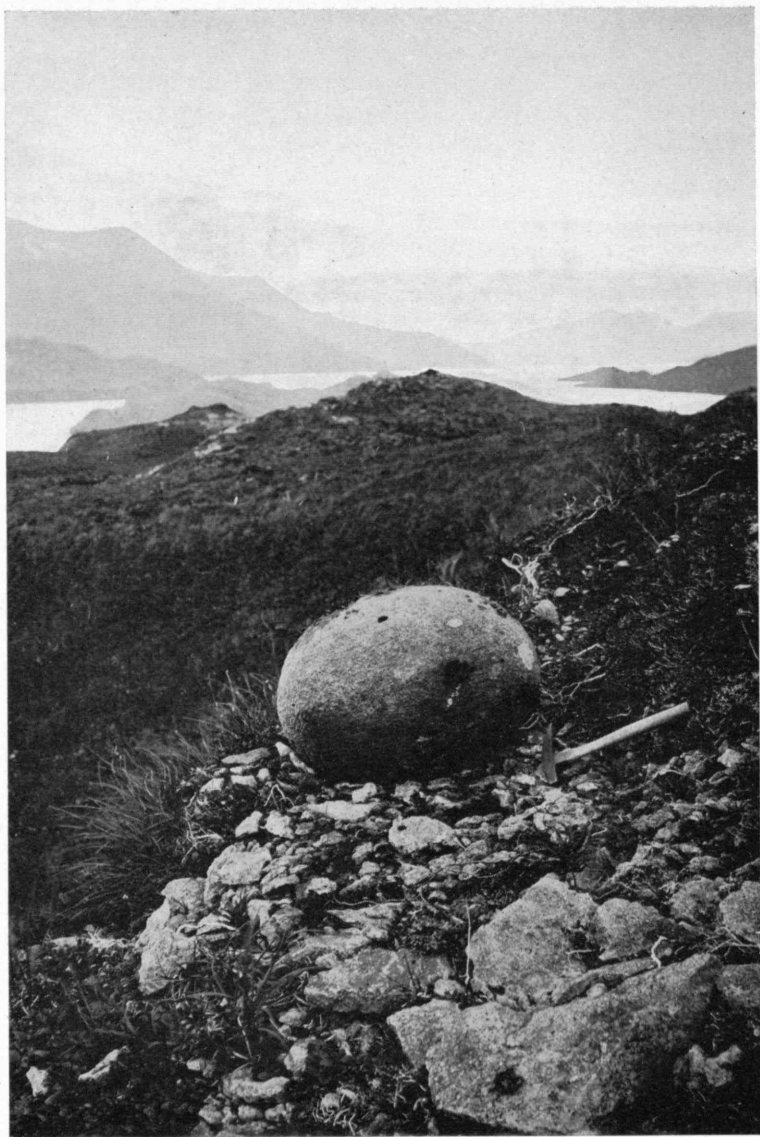
On the 23d the storm abated, we sailed at 9.30 A.M., and obtained fine views of the great horizontally bedded agglomerate sections of Akutan and the dissected crater of Akun Head, as we passed through the strait between Akun and Akutan, and then stood off to the east for Unimak Pass and the Pacific. The last view we had of Akutan showed the mountains still fog-bound.

*August 24 to September 11.*—Eighteen days of fair and frequently strong winds took the schooner to Seattle over a straight course, with record-breaking daily runs in succession of 110, 160, 180, 140 miles, and a maximum of between 10 and 11 knots an hour on Friday, August 30.

I take this opportunity to express the gratitude of the expedition to Messrs. Applegate, Dirks, Harman, Gray, Schroter, Etner, Lewis, Bolshanin, and others for many courtesies extended to the party during our visits to Unalaska and Dutch Harbor. I am personally indebted to Captain Dunwoody and Dr. Ebert, of the revenue cutter "Perry," for information concerning their examination of Bogoslof in 1906. To Captain Applegate especially the expedition owes much for his timely advice and willing assistance in connection with innumerable details. I have to thank Captain Worth G. Ross, chief of the Revenue Cutter Service in Washington, for assistance and copies of useful reports on Bogoslof, and am further under obligations to Dr. L. A. Bauer of the Carnegie Institution, Mr. Walcott of the Smithsonian, Mr. Brooks of the Geological Survey, Messrs. Tittmann, Pratt, and Rhodes of the Coast Survey, Lieutenant Eben Barker of the Revenue Cutter Service, and many other friends in



AMONG THE LUPINES AND DEEP GRASSES OF THE UPLAND OF ATKA



SEA-WORN BOULDER ON ELEVATED BEACH, 415 FEET ABOVE  
SEA-LEVEL, ANDERSON BAY, UNALASKA

Boston, Washington, San Francisco, and Seattle, through whose effort the expedition profited. Not least are we indebted to the twenty-nine subscribers whose generosity made the expedition feasible.

To review briefly the scientific work of the expedition, it is safe to say that the geological records are fully equal to what was hoped for when the voyage was planned. To study the volcanoes Makushin and Bogoslof and find out something about the older rocks of the chain were the first requirements of success, and these things were abundantly accomplished. The photographs were unexpectedly successful, considering the weather. Large collections of specimens were made for laboratory study. The visit to Bogoslof at a critical time, the discovery of the Shaler Mountains, of the granite and the elevated beaches, the determination of the north and south belts throughout the chain, characterized respectively by active volcanoes and older rocks, the bench levels containing lignite at high elevations,—all of these things are large items of significance which appear from the field notes. What may develop from laboratory study remains to be determined.

Professor Eakle secured a good collection for petrographical and mineralogical study. Dr. Van Dyke collected between 1,200 and 1,300 specimens of plants which have been sent to the Gray Herbarium to be reported upon by Professor M. L. Fernald. The expedition is indebted to Mr. N. T. Kidder for means to make this collection. Dr. Van Dyke further collected a large number of insects which he will himself report upon, as he is a skilled entomologist. His check-lists recording the work of former entomologists in these islands show that he has greatly increased the known fauna. Professor Gummere secured magnetic data which will be of value. Messrs. Myers and Sweeny made good sketch maps in many places, and have undertaken a special study of the crater of Makushin, which will probably be the subject of their joint graduation thesis at the Massachusetts Institute of Technology. Mr. Colby's reports are not yet complete, and at the time of this writing he had not returned to Boston from Alaska. He has, however, sent interesting letters, describing economic features of interest on the Alaskan Peninsula, and several cases of specimens have been received from him.

To continue research in physical geology at the Institute, of which the work of this expedition is but a beginning, money is needed. Few people realize how much there is to study, from week to week and from month to month, in the perceptible movements in and on the earth's crust. Owners of yachts have an enviable opportunity to increase the store of the



world's useful knowledge. Unalaska, accessible by steamer, forty miles from Bogoslof, itself rising slowly from the sea, with accelerations occasionally which produce quakes, is an ideal place for a permanent observatory of such movements. Any man of scientific habit of mind will understand how valuable and illuminating a set of photographs of Bogoslof would be, for instance, which had been taken once a week from the same spot during the last twenty months. An anchored camera with a chronographic exposing device could be used for a hundred similar purposes if such an instrument were even invented. And this is only one of a hundred such instruments which ought to be invented and applied to the physics of the earth. For the founding of *geonomical* observatories—laboratories for the interpretation of *earth law*—there is much more need of money to-day than for astronomical observatories. Geonomy is an almost unexplored science. It is the science of experimenting upon our own earth to see what it is doing. And the first call upon men to foster such experimentation is the call of humanity. The cry of suffering multitudes, which led Pasteur on from ferments and silk-worm disease to hydrophobia, was no more heart-rending than the cry of the terrorized millions who live in earthquake and volcano lands. For volcanic eruptions we already know that there are premonitory symptoms. It is only a question of experiment to learn to recognize them positively and so assist governments to deport populations when necessary. Even with our present crude knowledge, it is safe to say that, if a geonomic observatory had existed in Martinique in 1902, the lives of the 30,000 people destroyed at St. Pierre might have been saved. It is not safe even to guess how much science has lost in not possessing local records of the months preceding that eruption. And, as for earthquakes, it is merely necessary to mention Charleston, Gifu, Calabria, Valparaiso, San Francisco, and Jamaica. The temperaments of whole populations are affected by them. No science can avert them, but science can construct buildings intelligently, provide against fire, show what places are relatively immune, what seasons are most dangerous. It can instruct the public so as to destroy superstition and ignorant exaggeration; it can bring about coöperation in recording important facts—the collection of facts is every day leading to possibilities of greater confidence and less fear; and it is much more probable that we will be able in time to predict earthquakes than it was probable fifty years ago that we would ever send wireless messages three thousand miles.

The immediate need of the Research Laboratory of Physical Geology at the Massachusetts Institute of Technology is for a first research associ-



ate who shall give his whole time to seismographic experimentation, and for money wherewith to house and provide for the seismograph. Money for the instrument has been given, and a modern seismograph has been ordered from Germany. A complete seismometrical observatory should have several instruments and keep in touch with other observatories at distant points. The observatory should be provided with standard time, and have the service of a machinist to improve and modify instruments as required. Mr. Rotch has kindly offered to allow the seismograph to be set up at the Blue Hill Observatory. This location is an excellent one, on bed-rock, and association with that observatory could not fail to be an advantage. It is the wish of the donors of the seismograph, the trustees of the Caroline A. R. Whitney estate, that a small library of seismology and an earthquake museum, with photographs and similar records of earthquake phenomena, be started in association with the instrumental plant.

To the several ends here outlined there is needed for a beginning an income of five or six thousand dollars a year. If one or several donors will give a fair proportion of this amount, perhaps the Corporation of the Institute will furnish the balance. It would be much more satisfactory if the entire amount were furnished from without, as an evidence on the part of the alumni and of the public that they appreciate the example of the Acting President and of the generous subscribers to this expedition, and the efforts of all those within the school who are striving to extend its range of productive research.

## WHAT WILL THE CONGRESS DO?

Two bills of the greatest importance to the engineering interests of the country have been introduced at the present session of Congress, but they cannot pass unless engineers and others are willing to make their interest known in no uncertain manner.

House Bill No. 6122 provides for "the continuation [by the United States Geological Survey] of the investigations of the rivers and water resources of the United States." For the past twelve years the survey has been making investigations of the quantity, quality, and availability of surface and ground water throughout the United States. The results have been published regularly as Water Supply and Irrigation papers, and have been available for distribution and for reference throughout the country. These results are invaluable, not only to engineers interested in the development of water powers, hydro-electric or otherwise, but to every one concerned with the water supply for irrigation or other purposes. Last year the appropriation for this work was reduced from \$200,000 to \$100,000, barely escaping complete elimination on a legal technicality, and the amount of work performed has been proportionately reduced. As the value of such data as that on stream flow is largely determined by the length and continuousness of the record, it is most desirable that these investigations be resumed immediately.

A matter even more urgently demanding action is the acquisition of National Forests in the Southern Appalachian Mountains and in the White Mountains, as provided for in House Bill No. 10457. The forests which it is proposed to include are located at the headwaters of important streams of an interstate character. It is absolutely essential that these upper watersheds be protected from deforestation, if the water powers farther down stream are not to have their commercial value reduced to a mere fraction of what it is at present. In the words of the Secretary of Agriculture, "That [as a result of crude lumbering methods followed by forest fires] the two regions under consideration are advancing toward a condition of bar-

renness and sterility is the conclusion of every man who has had a part in this investigation. I do not refer to the loss merely of commercial timber. I mean absolute barrenness and sterility, without timber, without undergrowth, without soil." \* Under these conditions the water storage capacity of the land as an equalizer of stream flow will be practically destroyed and periods of flood and drought will be enormously accentuated.

The government is spending millions of dollars annually in dredging out the channels of navigable rivers, while the rivers themselves are depositing more than an equivalent amount of sand and silt eroded from deforested mountain sides. Much less money expended in forestry work on the higher watersheds would largely prevent the erosion.

The effect on the water supply alone is sufficient to warrant the creation of these national forests, but from the standpoint of timber production they are also necessary. The country has already crossed the threshold of a hard-wood timber famine. "In the last seven years the hard-wood-lumber cut of the country has fallen off over 15 per cent. . . . During the same period the wholesale prices of all classes of hard-wood lumber advanced from 25 to 65 per cent." † According to the most liberal estimates the hard-wood supply of the country cannot last more than sixteen years. Although there are large National Forests in the West, having a total area of

\* Senate Document No. 91. Report of the Secretary of Agriculture on the Southern Appalachian and White Mountain Watersheds, page 8: "In 1896 Professor N. S. Shaler, of Harvard University, said: 'South of Pennsylvania there is, according to my reckoning based on observations in every State in that upland country, an aggregate area of not less than three thousand square miles where the soil has been destroyed by the complete removal of the woods and the consequent passage of the earthy matter to the lowlands and to the sea. At the rate at which this process is now going on, the loss in arable and forestable land may fairly be reckoned at not less than 100 square miles per annum. In other words, we are each year losing to the uses of man, through unnecessary destruction, a productive capacity which may be estimated as sufficient to sustain a population of a thousand people.' This rate has not only been kept up, it has been greatly accelerated. Faster than was considered possible eleven years ago, these regions, through injudicious cutting, fires, clearing, and general misappropriation, are moving toward a forestless, soilless condition."

† *Idem*, page 9. This document can be obtained free from the Forest Service, Washington.

about 150,000,000 acres, these are composed almost exclusively of soft woods. There is at present no National Forest east of Arkansas, and the hard-wood land of the Lake States and Lower Mississippi Valley is ordinarily given over permanently to agriculture as soon as it is cleared. The Appalachian Mountains, therefore, will soon be the only large hard-wood area remaining in the entire country. Under government control, with forest fires almost entirely eliminated, the destruction of the younger growth in logging prevented, and a more complete utilization of the mature trees removed, the Appalachian region can be made to furnish annually a supply of hard-wood equal to the present consumption of the country. It may be of interest to point out that in the case of the State Forests of Prussia the introduction of improved methods of scientific forestry has increased the annual output per acre from twenty cubic feet in 1830 to sixty-five cubic feet in 1904. Under right methods of management an equal increase may be expected from Appalachian forests.

It will be seen, therefore, that both of these measures are of national importance. What will be the action of Congress? It is safe to say that it will be largely determined by the realization on the part of that body that the people are aroused to the necessity for the passage of these bills. Let every one, then, make his own feeling clear by personal letters to his representatives in Congress.

CHARLES H. PORTER '03.

## GENERAL INSTITUTE NEWS

## THE CORPORATION

A regular meeting of the Corporation was held at the Institute on the afternoon of Dec. 11, 1907. Acting President Noyes read his report, and Mr. Wigglesworth presented his final report as Treasurer of the Institute. Both documents, when printed, will be sent to all alumni of the Institute.

Memorial notices of Charles Merriam, Esq., and of Alexander S. Wheeler, Esq., were presented and adopted; and resolutions expressive of the gratitude of the Corporation for the many years of faithful service of Dr. Francis H. Williams, as Secretary, were adopted.

## THE CATALOGUE

The Catalogue for the present year which has recently appeared shows numerous changes as compared with the previous issue. The most important of these are in connection with the extensive provision that has been made for Graduate Courses and Advanced Study. There have been prepared schedules of elective subjects suitable for the arrangement of advanced courses of study for graduates in all the different departments of the Institute, and in particular provision has been made by which graduates of colleges can arrange a course leading to the degree of Master of Science without being required to obtain first the Bachelor's degree. In connection with these courses many additional subjects of instruction of an advanced character are now offered for the first time.

Important alterations in the courses in Mechanical and Electrical Engineering and Naval Architecture are shown. These changes were rendered possible by a reduction in the requirement in Modern Languages, and the time thus set free has been devoted in part to literary subjects and the introduction of the study of Applied Me-

chanics at an earlier period in the course, and in part to the more thorough study of important engineering principles.

Announcement is made that applicants for admission in 1909 and thereafter must present satisfactory evidence of preparation in two electives instead of in one, as heretofore. The entire elective requirement may, however, be covered by a satisfactory examination in intermediate French or intermediate German.

Numerous changes in the instructing staff are indicated. During the past year 5 members of the Faculty have resigned and 13 new members have been appointed. The entire instructing staff now numbers 253.

In the Statistics of the Graduates, Doctors of Philosophy appear for the first time, this degree having been conferred last June upon three candidates. The total number of graduates of the Institute is now 3,887.

The Register of Students shows that the total number attending the Institute is now 1,415, a slight increase over last year. Relatively, the number of special students is considerably less than last year.

#### COURSE CHANGES

Changes in the schedule of studies of Course VI. have been adopted similar to those already adopted in Courses I., II., XI., and XIII., beginning Applied Mechanics in the second term of the second year, but, unlike the other courses, not omitting an entire year of modern language. This new plan provides for a course of two hours per week, during the first term, in Advanced French or German, each student to continue the language which he elected to take during the first year. It is hoped that by this method the students will become proficient in at least one of the modern languages. In the fourth year a number of optional subjects have been added. Thus in the first term 110 hours are to be given to some of the following: General Studies, Electrical Testing, Dynamo Design, and Central Stations; and in the second term 120 to 170 hours are to be given to some of these subjects: General Studies, Central Stations, Journal Meetings and Excursions,

Acoustics and Telephony, Telephone Engineering, Electric Railroads. Students are advised to select not less than seventy-five of these hours from General Studies (English, History, Economics, Modern Languages).

Elective subjects for graduate work in most of the professional departments have been adopted. As examples, in Course I. the major subjects are new courses in Structural Design; Railroad Engineering; Railroad Design; Hydraulic Design; Water Power, Irrigation and River Works; Purification of Water and Sewage; and Specifications and Contracts; and in Course II. the major subjects are: Advanced Theory of Elasticity; Analytic Mechanics; Advanced Machine Design; and Advanced Steam and Gas Engineering.

#### AN IMPORTANT PLAN

The Faculty has under consideration a proposed course in Electrical Engineering to be carried on in co-operation with the General Electric Company, the plan for which was suggested by a member of that company. A committee has been appointed by the Faculty, which has made a preliminary report suggesting a possible way in which such a course could be carried on, but recommending that the officers of the General Electric Company be asked to meet in conference with representatives of the Faculty to consider the matter further before the Faculty shall express a final opinion.

#### UNIVERSITY OF VIRGINIA

UNIVERSITY OF VIRGINIA,  
Charlottesville,

*Office of the President.*

OCTOBER 24, 1907.

MRS. WILLIAM BARTON ROGERS,  
Newport, R.I.

*My dear Mrs. Rogers,*—On the 15th of October I had the honor to propose the following resolution to the rector and visitors of the University of Virginia:—



*Resolved*, That the Chair of Economic Geology recently established at this University be designated the "William Barton Rogers Chair of Economic Geology," in recognition of the eminent and devoted services of William Barton Rogers to the University of Virginia.

It gives me great pleasure to inform you that this resolution was adopted unanimously and with great enthusiasm by the rector and visitors of the University of Virginia. The Chair of Economic Geology was established in the University last June. The first incumbent is Thomas Leonard Watson, who came to us from the Virginia Polytechnic Institute. He is a man of distinction and eminence in geological work in this country. We are hoping to induce the State to enter upon the work of the geological survey. If we can succeed in this effort, the work which your distinguished husband inaugurated will be carried to full completion.

I trust that the William Barton Rogers Chair of Economic Geology in this University will prove a source of unmeasured strength to the intellectual and economic development of the State.

Very sincerely,

(Signed) EDWIN A. ALDERMAN,  
*President.*

#### INSTRUCTORS' CLUB

At the first meeting of the Instructors' Club about thirty-five members heard an interesting address by Dr. Charles Tenney, formerly president of the English College of North China at Tien Tsin. Dr. Tenney has done much toward interesting the Eastern people in technical education, and has been influential in sending Oriental students to the Institute.

The officers of the Instructors' Club elected for the ensuing year are: president, Arthur A. Blanchard, Ph.D., of the Chemical Department; vice-president, Daniel F. Comstock, S.B., of the Physics Department; secretary and treasurer, Chauncy C. Batchelor, A.B., of the English Department; executive committee, Walter H. James, S.B., of the Mechanical Engineering Department, and Ernest A. Mueler, A.M., of the Department of Mathematics.

NOTES BASED UPON THE ANNUAL REPORTS OF THE STANDING  
COMMITTEES OF THE FACULTY*Committee on Advanced Degrees and Fellowships*

The work of the committee during the past year has consisted chiefly in the recommendation of fellowship awards to individual students pursuing advanced study, in the acceptance of candidates for advanced degrees and recommendations for such degrees, and in the arrangement of advanced courses of study.

Grants to the amount of \$4,850 have been made for eight fellowships and four special grants, \$2,250 of the amount being for graduate work at the Institute: the remainder was for two fellowships for work at Harvard and three for work abroad. Of these grants six were for work in Chemistry, two in Architecture, and one each in Physics, Electrical Engineering, and Mechanical Engineering.

During the past year three candidates were for the first time awarded the degree of Doctor of Philosophy. These men carried on investigations in the Research Laboratory of Physical Chemistry, and pursued advanced studies in Chemistry as major subjects and in Physics and Mathematics as minor subjects. Both oral and written examinations were held.

Advanced courses of study have been arranged for by the committee in almost all of the thirteen professional courses. The development of these courses consists in offering in the various departments a large number of new advanced subjects of instruction, and in the specification of such undergraduate subjects of instruction in allied sciences as will be accepted as part of a course of study for an advanced degree. The former class are designated as "major subjects" and the latter as "minor subjects," and more than one-half of the candidate's work must be of the former class. As this is thought to be an important development of the scope of the Institute's work, the list of major subjects to be offered as elective studies for the higher degrees by the departments at the beginning of the next school year is reproduced here:—

*Civil Engineering.*—A Thesis, Structural Design, Railroad Engineering, Railroad Design, Hydraulic Design, Water Power, Irrigation and River Works, Purification of Water and Sewage, Specifications and Contracts.

*Mechanical Engineering.*—Research, Advanced Theory of Elasticity, Analytical Mechanics, Advanced Machine Design, Advanced Steam and Gas Engineering.

*Mining Engineering.*—Research, Advanced Mining Engineering, Advanced Ore Dressing, Mining Plant Design, General Metallurgy (Lectures and Laboratory), Minor Metals, Metallurgical Calculations, Metallurgical Design, Advanced Economic Geology, Advanced Field Geology, Geology of the Igneous Rocks, Chemical Mineralogy and Geology, Advanced Petrography, Advanced Paleontology, Distillation of Fuels, Heat Measurement.

*Architecture.*—Advanced Architectural Design, Advanced Composition lectures, Advanced Architectural Design Thesis, Philosophy of Art lectures, European Civilization and Art (advanced course), Advanced Life Class, Composition and Decorative Design, Advanced Pen and Pencil Rendering, Advanced Constructive Design, Building Laws and Contracts, Æsthetics, Landscape Architecture lectures, Landscape Design, History and Archæology.

*Chemistry.*—Chemical Research, Research Reports, Advanced Theoretical Chemistry, Advanced Inorganic Chemistry, Advanced Industrial Chemistry, Qualitative Analysis of Rare Metals, Organic Qualitative Analysis, Recent Developments in Organic Chemistry, Free Energy and Chemical Equilibrium, Applications of Physical Chemistry to Inorganic Chemistry, Polarized Light and its Applications, or Radiation, given in alternate years.

*Electrical Engineering.*—Advanced Research, Alternating Currents, Electrical Engineering Laboratory, Advanced Dynamo Design, Design of Stations and Distribution of Systems, Advanced Electrical Testing, Electrical Engineering Seminar, Organization and Administration of Public Service Companies.

*Biology.*—Research, Epidemiology, Purification of Water and Sewage, Sewage Disposal Practice, Public Health Laboratory Practice, Dairy Bacteriology, Sanitation of Water Supplies, Sanitation of Houses and Public Buildings, Bacteriology of Fermentation Industries.

*Physics.*—Physical Research, Constitution of Matter in the Light of Recent Discovery, The Electromagnetic Theory of Light, Radiation, Polarized Light and its Applications, Applications of Thermodynamics to Chemical Problems, Advanced Theoretical Chemistry, Free Energy and Chemical Equilibrium, Applications of Physical Chemistry to Inorganic Chemistry, Hydrodynamics, Applications of Differential Equations to Mechanics.

*Electro-Chemistry.*—Research, Applied Electro-Chemistry, Special Problems, Applications of Thermodynamics to Chemical Problems, Advanced Industrial Chemistry, Advanced Inorganic Chemistry, Advanced Theoretical

Chemistry, Chemical Engineering (special problems), Alternating Currents (Advanced), Electrical Engineering Laboratory.

*Chemical Engineering.*—Research, Research Reports, Chemical Engineering (special problems), Advanced Inorganic Chemistry, Advanced Theoretical Chemistry, Qualitative Analysis of Rare Metals, Organic Qualitative Analysis, Recent Developments in Organic Chemistry, Applications of Thermodynamics to Chemical Problems.

*Sanitary Engineering.*—A Thesis, Structural Design, Sanitary and Hydraulic Design, Sanitary Statistics, Water Power, Irrigation and River Work, Sanitation of Water Supplies, Purification of Water and Sewage, Sewage Disposal Practice, Specifications and Contracts, Sanitation of Houses and Public Buildings.

#### COMMITTEE ON FIRST-YEAR STUDENTS

The chief work of this committee is the consideration and discussion of the records of the first-year students at the various examination periods; for this the committee meets at the end of each five weeks of the first and second term. Opinions of the teachers in the preparatory schools of these first-year students are frequently read to the committee during the discussion of the individual records, as well as those expressed by the Institute instructors of these students, and these are both considered in connection with the records. In cases seeming to require Faculty action it is usual to refer the students to the Dean before any serious action is taken. Students whose records are not very satisfactory and are not known to the Dean are frequently referred to him for friendly advice.

#### COMMITTEE ON SECOND-YEAR STUDENTS

This committee, like the Committee on First-year Students, meets at the end of each five weeks of the first and second term. This committee meets, however, at the opening of the first term, to consider requests made by new second-year students to be admitted to certain subjects which require a record of "P," or better, in certain of the major first-year subjects. Certain students who because of the Faculty requirements would be unable to continue second-year work, are thus allowed to continue this work provisionally, sometimes subject to an additional examination in January, and at other times subject to doing good work in these courses to which they are admitted provisionally.

## COMMITTEE ON MILITARY EXERCISES

There seems to be a very gratifying disappearance of any tendency to disorder or misconduct, there being a general attitude in favor of discipline. The commissioned officers are all from the upper classes. They attend at their own request, and more applied than could be accepted.

At the target practice, which is a comparatively new feature of the work, there was an average attendance of thirty-five during October. There is also a rifle club with twenty or thirty members.

## COMMITTEE ON PERIODICALS AND LIBRARIES

Nearly \$2,000 per year is required for the subscriptions for periodicals for the libraries. One of the needs of the library which has been felt with the increased use of the general library is that of a fund for the purchase of books of a general character not properly appertaining to any special teaching department.

The Institute possesses three endowment funds for the library: the Charles Lewis Flint Fund, with an income of about \$200 per year "for books and scientific publications"; the William Hale Kerr Fund, with an income of about \$80 per year "for books and drawings for the Library of Machine Design"; and the Rotch Architectural Library Fund, with an income of \$200 per year for the library or collection of the Department of Architecture. A gift of \$1,000 was made during the past summer by the Saturday Club of Boston for the purchase of books.

At present each department has a separate departmental library, excepting the Departments of English Literature and Military Science, whose books are in the general library, and the Departments of Economics and History, whose books are in one collection. Also the Departments of Civil and Mechanical Engineering have their libraries united. It is suggested that a further union of some of these libraries would be advantageous. Thus, if the libraries of Civil, Mechanical, and Electrical Engineering and of Naval Architecture were united in one engineering library, it would avoid a considerable duplication of books and periodicals and make possible a greater efficiency of administration. Such a union of libraries would also be of much benefit to the students, as these branches of engineering are so closely allied that many of the subjects relating especially to one department are required for reference in some of the other departments.

During the past year the library has endeavored to have the Institute placed on the free list for the Publications of the Carnegie Institution, but

without success, so that the Institute is still obliged to purchase these publications except when they are supplied otherwise.

#### COMMITTEE ON PETITIONS

This standing committee meets at least once a week during each of the two terms, and oftener at the beginning of the terms. During the past school year 1,764 petitions have passed through the hands of this committee. Students are required to petition for all exceptions to the Faculty regulations which outline the prescribed courses and the requirements for admission to them.

#### COMMITTEE ON PROVISIONAL STUDENTS

Students who apparently cannot pursue the regular courses with profit, and whose records make it seem somewhat doubtful as to the wisdom of their being allowed to continue at the Institute, are referred from time to time to the Committee on Provisional Students. Also students who for one reason or another did not take the entrance examinations are likewise placed in charge of this committee, as well as all students who have been required to withdraw from the Institute and have, after a period of absence, been readmitted. This committee considers the cases of the students and outlines their plan of study.

#### COMMITTEE ON PUBLICATIONS

11,500 Catalogues, 4,500 President's Reports, 4,300 Registers of Graduates, and 4,500 Programs have been printed, and nearly all of them distributed. The Register of Graduates was sent this year to every graduate, and it is expected that this practice will be followed in every third year.

The *Architectural Record* recently established by the Department of Architecture, though not in charge of the committee, should be referred to as an important addition to the publications of the Institute.

#### COMMITTEE ON THE RECOMMENDATION OF GRADUATES FOR APPOINTMENT

The business of the committee has been transacted by the members individually under the general direction of the chairman, and a large number of recommendations for appointment have been made. The work of the committee has been of great assistance to many of our graduates, and is being more and more highly appreciated by them.



## COMMITTEE ON SUMMER READING

It is believed that the course in Summer Reading was made more valuable and attractive when, three years ago, the plan was adopted of allowing each student to select the books that he preferred to read from a list containing a much larger number, in place of the plan of requiring specified books to be read.

The lists of books for the first-year and for the second-year students are given herewith. At the left of each title is a number showing the credit allowed for each book, each student being expected to read carefully as many books as will give a total credit of at least 100 points, and at the right is a number showing how many students during the past three years have elected to read each book.

## FIRST-YEAR LIST

*History*

10.	Froude, J. A.	English Seamen in the Sixteenth Century . . .	138
25.	Fiske, John.	American Revolution . . . . .	173
5.	De Quincey, T.	Joan of Arc . . . . .	112
15.	Parkman, Francis.	The Oregon Trail . . . . .	405
5.	Macaulay, T. B.	England in 1685 . . . . .	131
15.	De Ségur.	La Retraite de Moscou (in French) . . . . .	21

*Fiction*

10.	Dickens, Charles.	A Tale of Two Cities . . . . .	420
20.	Eliot, George.	Romola . . . . .	417
10.	Stevenson, R. L.	Kidnapped . . . . .	442
15.	Bulwer-Lytton, E. L.	The Last Days of Pompeii . . . . .	429
15.	Scott, Walter.	Quentin Durward . . . . .	396
15.	Zschokke.	Das Abenteuer einer Neujaarsnacht (in German) . . .	29

*Poetry*

10.	Shakespeare, W.	Othello . . . . .	483
10.	Shakespeare, W.	Julius Cæsar . . . . .	551
10.	Palgrave, F. T.	The Golden Treasury. Selections . . . . .	128
10.	Henley, W. E.	Lyra Heroica. Selections . . . . .	28
5.	Scott, Walter.	Lady of the Lake . . . . .	413
5.	Scott, Walter.	Lay of the Last Minstrel . . . . .	264
5.	Whittier, J. G.	Poems. Selections . . . . .	208



*Science*

20. Tylor, E. B. Anthropology: An Introduction to the Study  
of Man and Civilization . . . . . 156
15. Newcomb, Simon. Astronomy for Everybody . . . . . 177
10. Frankland, Mrs. P. Bacteria in Daily Life . . . . . 91

## SECOND-YEAR LIST

*History*

15. Fiske, John. The Critical Period of American History . . . . . 245
25. Parkman, Francis. Montcalm and Wolfe (2 vols.) . . . . . 144
10. Mombert, J. I. A Short History of the Crusades . . . . . 74
10. Smith, Goldwin. Three English Statesmen . . . . . 52
50. Motley, J. L. The Rise of the Dutch Republic (3 vols.) . . . . . 125

*Fiction*

10. Hawthorne, Nathaniel. The House of the Seven Gables . . . . . 401
20. Scott, Walter. The Heart of Midlothian . . . . . 420
20. Thackeray, W. M. Henry Esmond . . . . . 400
20. { Reade, Charles. The Cloister and the Hearth }  
      { Kingsley, Charles. Westward Ho! . . . . . } or 430
15. Balzac. Cinq Scènes de la Comédie Humaine (in French) . . . . . 21
15. Goethe. Sesenheim (in German) . . . . . 22
15. Alarcón. El Capitán Veneno (in Spanish) . . . . . 7

*Poetry*

10. Shakespeare, W. Hamlet . . . . . 509
10. Shakespeare, W. Twelfth Night . . . . . 462
10. Bryant, W. C. Certain books of Homer's Iliad . . . . . 130
10. Repplier. A Book of Famous Verse. Selections . . . . . 97
5. Pope, Alexander. Essay on Man . . . . . 241
5. Longfellow, H. W. Poems. Selections . . . . . 277
5. Macaulay, T. B. Lays of Ancient Rome . . . . . 208

*Science*

15. Newcomb, Simon. Astronomy for Everybody . . . . . 203
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## COMMITTEE ON THE RELATIONS OF SECONDARY SCHOOLS

To this committee are usually referred only those matters dealing with a larger and broader aspect of the relations of the Institute with secondary schools, as the special questions are referred to certain administrative officers or to other Faculty committees.

In recent years the committee has especially co-operated in the holding of meetings of secondary teachers here at the Institute,—meetings which have been mutually profitable in making personal acquaintance and in reaching a better understanding concerning the expectations of the Institute and the ability of the schools to meet those expectations.

The present Faculty Committee is well constituted in view of the fact that several of its members have been members of school committees and almost all are members of one or more teachers' associations to which preparatory school teachers belong. The majority are likewise members of the Faculty Committee on Entrance Examinations; and, on account of a considerable amount of school visiting which some of the members have done, a wide and reasonably accurate knowledge of the secondary schools is possessed by the committee.

## COMMITTEE ON UNDERGRADUATE SCHOLARSHIPS

The total number of students assisted from the Institute funds during the past year was 158, and the amount awarded was \$18,562.50. In addition to this the State aided 65 students, 45 of whom were not aided by any Institute grant. The total number of students, therefore, in the Institute receiving aid either from Institute funds or from State grants was 203, and, on the basis of 1,397 students registered at the Institute for the year, the ratio of students receiving aid was about 1 to 7.

Institute awards are not made until the Scholarship Committee has carefully considered the applicant's need and scholarship. A regular blank is filed by the applicant, and an appointment is made for him to meet at least one or two members of the committee, of whom one is generally the chairman. These conferences usually last from eight to fifteen minutes, except for students whose cases have been previously studied.

At the end of each term the records of all applicants for scholarship aid are reviewed, and an estimate of the average grade of scholarship of each is presented to the Scholarship Committee, together with the results of the individual conferences and the correspondence submitted by those persons to whom each applicant refers. Only students who are needy and also

have records which indicate that they will graduate are granted scholarship assistance.

Awards are, in general, made for the whole year, five-eighths of the award being applicable to the first term. At the end of the first term the records of the students recommended for awards are reviewed, and those whose records have fallen below the standard required by the Scholarship Committee forfeit that part of their award which was to have been applied to the second term. Also students whose scholarship does not reach the standard required are recommended at the opening of the year for second-term assistance, subject to their obtaining during the first term a better record than their present one.

It is not the custom of the committee to make grants to first-year students. Only in exceptional cases is this rule departed from, awards being occasionally made for the second term of the first year, depending on the first term's record. This restriction concerning first-year students does not apply, however, to State awards.

During the summer, applications for State scholarships are submitted by the State Board of Education to the committee for advice and recommendations. At the meeting last summer for this purpose 151 such applications were considered. The recommendations of the committee are followed in by far the larger number of cases.

#### DEPARTMENT NOTES

##### MINING ENGINEERING

The fourth-year laboratory list contains 24 students, the third-year mining list contains 29, the second-year class in elementary mining contains 52. While the fourth year is a little smaller than it has been for the last two or three years, the classes will average up fully to the numbers we have been having lately.

The hard times are being felt to some extent by our graduates. A few have written asking for places. Some men are taking advantage of the hard times to get a little vacation which they have not had in the recent rush times.

Among former students who have called at the Institute recently are R. H. Sweetser, who is changing from Sault Ste. Marie to Columbus, Ohio; Mr. W. A. Sheldon called, his establishment

having shut down; Mr. R. B. Williams has just returned from a three years' service in Ecuador; Mr. A. F. Bennett is on a vacation from Mexico; Mr. T. F. Geraghty has come home for a vacation from Chicago; Mr. A. W. Tucker has been in Boston on company business; Mr. Moses Brown, Jr., is in Boston on a vacation; Mr. A. H. B. Arnold and Mr. F. F. Colcord are on vacations.

In regard to the apparatus in the Mining Department there have been recently added two new pulsator classifiers, one new pulsator jig; there is in contemplation a Johnston vanner; there has been installed recently a new Wilfley table top with certain improvements; and a new Hansell jig and two new compressors have been added to the plant.

In the direction of furnace work and metallography, in the blast furnace and reverberatory work, measurements of temperature and analyses of gases have been introduced for the making of complete computation of heat developed and the distribution of heat, and a new Friedrich gas reverberatory furnace, a new Heraeus electric resistance tube furnace, and a new Siemens millivoltmeter have been added.

#### CHEMISTRY AND CHEMICAL ENGINEERING

The number of students taking chemical subjects this year is nearly the same as last. The laboratories of inorganic chemistry are not filled to their capacity this term, but will be more nearly so next term, as it is then desirable to assign extra desk space to students who are making inorganic preparations. This course, introduced for the first time last term, has apparently been most successful as a preparation for later work. The experiences of last year will make possible some improvements in details this year.

The laboratories of analytical chemistry are just completely filled this year, some of the desks being occupied, however, by the chemical engineers who are taking organic chemistry. The problem of providing for all the students in organic and in analytical chemistry for next year is already occasioning some perplexity.

Among the new members of the instructing staff this year are graduates from other institutions, as follows: from the University

of Toronto and the University at Heidelberg, Dr. E. B. Spear; from the University of Minnesota, Mr. W. W. Kennedy; from Clark College, Mr. C. B. Nickerson; the Institute and Göttingen University, Dr. R. S. Williams; and from North-western University and the Institute, Mr. C. R. Bragdon. Mr. R. C. Tolman has also spent considerable time in study at German technical schools and in research work at the Institute.

Dr. Fjeld Halvorsen, of the University of Christiania, is spending this term at the Institute for the study of methods of instruction, particularly in industrial chemistry. He is taking the full work of the courses in Industrial Chemistry, lectures and laboratory, and in Proximate Technical Analysis, and is a visitor at other classes. He was for three years assistant to Professor Liebmenn at Charlottenburg, Germany, and has charge of the instruction in technical chemistry at his home university, from which he has leave of absence for this study in American institutions.

Dr. Wilhelm Mastowitch, of the Technical Institute for Mining Engineering at Tomsk, Siberia, who is spending some weeks at the Institute for purposes similar to those of Dr. Halvorsen, but with reference to the Mining Department, is carrying on an investigation on the decomposition of pure calcium sulphate, and is preparing his material in the Chemical Department.

Within the past year Dr. Gill has introduced a card system of accounting, both for supplies and for the distribution of these to students and instructors, which will much diminish the labor of making up accounts at the close of the year, and which also facilitates inspection of accounts by students. Considerable additions have been made to the stock of platinum, especially crucibles, and it is hoped that it will now be possible to loan crucibles more generally and to lessen the burden of expense imposed by the purchase of platinum at the prices which have recently prevailed. This can be arranged under conditions which will also insure a proper return to the Institute for the capital invested.

Mr. George W. Rolfe has been granted leave of absence for the remainder of the year, and has gone to Porto Rico for the season.

Dr. Gill has just issued an interesting little volume on Engine-

room Chemistry, in which the subject is presented in easily understandable form. It is published by Hill Publishing Company, New York.

Dr. Gill has been appointed a member of the Committee on Oil Analysis of the International Congress of Applied Chemistry; and Dr. Talbot has been made a member of a similar International Committee on Chemical Analysis, which is primarily expected to consider questions of uniformity of analytical procedure in analyses of technical importance.

Professor Walker has been elected one of the alumni members of the board of trustees of Pennsylvania State College, and recently attended an important meeting of the board, at which a president of the college was elected. He has been called to Chicago several times during the fall and winter as expert in an important patent suit.

Professor Whitney has been seriously ill and confined to the hospital for some weeks, but is fortunately now regaining his health. Dr. Fay has been obliged to spend considerable time at his home on account of the illness and death of his father, a highly respected physician of Altoona, Pa.

Messrs. H. E. Batsford and J. A. Christie, the students who completed respectively the second and first terms of the summer course in Applied Chemistry at the works of Harrison Brothers & Co. at Philadelphia, mentioned in the REVIEW, report a most pleasant and profitable summer.

#### ELECTRICAL ENGINEERING DEPARTMENT

The modifications of Course VI. which were briefly described in the July number of the TECHNOLOGY REVIEW were last spring referred by the Faculty to its Committee on Courses of Instruction. This committee made some modifications in the details of the arrangement and then recommended the adoption of the plan. The modifications have recently been acted upon by the Faculty and adopted in accordance with the recommendation of the Committee on Instruction, and the modified course will go into effect this year with the second-year students, beginning with the

second term. Next year the third-year students will gain the advantage of the improvements in the course.

In addition to the modifications of the undergraduate course introduced for the reasons described in the July number of the REVIEW, it has seemed desirable to alter and improve the plan of instruction for graduate students in the department, and the alterations have been adopted by the Faculty and will be found published in the recently issued Catalogue. In this adopted plan the students who are working for a Master's degree are thrown very distinctly upon their own resources for the purpose of developing their initiative and executive sense, as far as this may be possible in a year or two of advanced work; but the study will receive suitable direction by the teachers of the department. The study directed by the department will include an adequate thesis worked out by each of these graduate students, which deals with some subject selected with a view to testing and developing the student's initiative, resourcefulness, and executive capacity. Besides the thesis it is planned that each student shall follow at least one major course of advanced theoretical lectures and one or two minor courses, and that he shall also attend a seminar for the purpose of studying the trend of contemporary advance in electrical engineering and the relations of this trend to the historical development of the art.

Professor Clifford has developed his advanced lectures on alternating current phenomena to meet the conditions of this plan, and appropriate courses of an advanced nature are also offered by Professor Laws in electrical testing, by Professor Shaad in design of power stations and distribution systems, by Professor Lawrence in electrical engineering laboratory, and by Professor Derr in dynamo design. Professor Smith gives a course in which the field of electrical engineering is surveyed in a manner appropriate for the graduate students in Courses III. and V.

It has seemed in this connection desirable that lectures upon the organization and administration of public service companies should be made available to students. The duties of the numerous engineers who are employed by electric light, electric railway,



and telephone operating companies, have come to have so much to do with the administrative affairs of these corporations controlling public utilities that suitable lectures on the public relations of the companies may be of great service. For this reason graduate study of the organization and administration of public service corporations is provided for by lectures by Professor Jackson, which are to be accompanied by extensive assigned reading and the examination of operating records. The lectures will treat of the relations of public service companies to the government and to the people. They will also treat of the methods of organizing public service companies, the legitimate expenses entering into the cost of their organization, the management of the companies viewed especially from the commercial aspect, and the legitimate functions of such companies. An interesting and very desirable feature of this course of study lies in the fact that certain aspects of the subject will be treated by the Department of Economics with the object of giving the students a clear view of the requirements of public interest.

In connection with the meetings of the Electrical Engineering Society, which consists of third and fourth year students in Course VI., it has heretofore been the practice of the society to have meetings once a month at some of which students take a part, describing experiences of their own or the result of their travels, and at other meetings alumni or others of moment living in Boston or its vicinity have given technical lectures upon various matters of engineering practice. It has seemed desirable to add to this the advantages which may be derived by sociably dining several times a year, and for this purpose the department has planned several simple dinners for the society to be held at the Tech Union. The generosity of certain alumni has made this possible, as the department funds are not sufficient to warrant the expense and it did not seem desirable to call upon the students for the expenditure. At each dinner it is planned to have, as the special guest of the society, some engineer of distinction who will dine with the society (singing college songs and becoming acquainted with the members during the dinner), and who will then speak to the mem-

bers for forty or fifty minutes in regard to the life of the practising engineer. These speakers are expected to avoid matters of purely technical interest, and are supposed to confine their remarks to incidents in the life of the professional engineer and a discussion of his sphere of influence.

One of these dinners was held during the latter part of the second term of last year, and Mr. Frederick P. Fish was the special guest of the society at that dinner. Another dinner was held on the evening of December 5, and Mr. H. G. Stott, president of the American Institute of Electrical Engineers, was the special guest for that evening. In each instance the occasion has been one of much satisfaction and good fellowship, and it is to be hoped that funds for continuing these affairs will be made permanently available. Approximately \$300 a year is required for the purposes.

Professor Clifford returned from his European trip on November 12, very much refreshed.

The "Standard Handbook for Electrical Engineers," of which Professor Shaad wrote one section, has recently been issued.

#### THE RESEARCH LABORATORY OF PHYSICAL CHEMISTRY

This laboratory opened on September 1 for its fifth year. Professor G. N. Lewis has been appointed acting director of the laboratory in place of Professor A. A. Noyes, who is temporarily acting as President of the Institute. Investigations are being carried on in the laboratory by sixteen men, of whom ten are devoting their whole time to research work. The new members of the research staff are Professor Carl von Ende (Ph.D., Göttingen), Mr. John Johnston (B.Sc., St. Andrews), and Mr. Roger D. Gale (S.B., Massachusetts Institute of Technology). Mr. R. B. Arnold (S.B., Rose Polytechnic Institute) enters as a candidate for the degree of Doctor of Philosophy.

As in the past, a considerable part of the research work bears upon the problems of conductivity in aqueous solutions at high temperatures. The results of the numerous investigations in this field, which have already been completed in this laboratory, have

recently appeared in a comprehensive memoir published by the Carnegie Institution. A new form of conductivity bomb, capable of withstanding very high pressures, has recently been constructed. In this bomb the vapor pressure, density, and compressibility of water up to the critical point are being studied, as well as the influence of pressure upon the electrical conductivity of solutions. Closely allied investigations are being made upon electrical transference in mixed salt solutions, the solubility of salts in water at high temperatures, and the dielectric constant of water up to its critical point.

In another field of investigation which is receiving special attention in this laboratory several investigations are under way. These are directed towards the determination of the common electrode potentials and of the free energy of important chemical reactions. Indirectly, but vitally connected with these researches is an investigation of the specific heat of gases at very high temperatures, which is now being undertaken by Professor H. M. Goodwin and Dr. H. T. Kalmus.

The general scheme of qualitative analysis developed by Professor A. A. Noyes and Dr. W. C. Bray is being extended to include the detection of the acids. Other investigations begun in previous years on the hydration and the true transference numbers of the ions, on the electromotive force produced in a solution by rotating it at a very high rate of speed, and on the properties of the solutions of metals in liquid ammonia, are being brought to a successful conclusion. Mr. C. A. Kraus, who is carrying on the last-named investigation, has succeeded in finding the missing link between the metallic and the electrolytic conductor, and has thus obtained a new point of attack for the problem of the electron.

During the past year a gift of \$500 has been received from the William E. Hale Research Fund and one of \$3,000 from a private source in support of the work of the laboratory. In addition, Professor A. A. Noyes has received a grant of \$2,000 from the Carnegie Institution for assistance in carrying on the researches above referred to on the conductivity of aqueous solutions.

The Teachers' School of Science, established by the Lowell Institute of Boston, offers this winter, as a new departure, a course

of fifteen lectures to teachers on the fundamental principles of physical chemistry, discussed with special reference to their application in the teaching of elementary science.

The lectures are given by Professor G. N. Lewis on Saturday forenoons, and are attended by about sixty members of the New England Association of Chemistry Teachers.

SERIAL PUBLICATIONS OF THE RESEARCH LABORATORY, 1907

No. 15. "The Specific Heat of Solids at Constant Volume, and the Law of Dulong and Petit." By G. N. Lewis. *Journal of the American Chemical Society*, vol. xxix. pp. 1165-1168, 1907.

No. 16. "On the Density, Electrical Conductivity, and Viscosity of Fused Salts and their Mixtures." By H. M. Goodwin and R. D. Mailey. *Physical Review*, December, 1907.

No. 17. "Outlines of a New System of Thermodynamic Chemistry." By G. N. Lewis. *Proceedings of the American Academy of Arts and Sciences*, vol. xliii. pp. 259-293, 1907.

No. 18. "Solutions of Metals in Non-metallic Solvents." I. General Properties of Solutions of Metals in Liquid Ammonia. By C. A. Kraus. *Journal of the American Chemical Society*, vol. xxix. pp. 1557-1570, 1907.

No. 19. "The Electrical Conductivity of Aqueous Solutions." *Publications of the Carnegie Institution of Washington*, No. 63, pp. 1-352, 1907. Part I., by A. A. Noyes; Part II., by A. A. Noyes and W. D. Coolidge; Part III., by W. D. Coolidge; Part IV., by A. A. Noyes and A. C. Melcher; Part V., by A. A. Noyes and H. C. Cooper; Part VI., by A. A. Noyes and Y. Kato; Part VII., by R. B. Sosman; Part VIII., by A. A. Noyes and G. W. Eastman; Part IX., by C. W. Kanolt; Part X., by W. Böttger; Part XI., by A. A. Noyes and Y. Kato; Part XII., by A. A. Noyes.

OTHER PUBLICATIONS OF THE RESEARCH STAFF

C. L. von Ende, a translation of Abegg's "The Electrolytic Dissociation Theory." John Wiley & Sons, New York, 1907.

C. L. von Ende (with K. E. Guthe), "Standard Cells." *Physical Review*, vol. xxiv. pp. 214-221, 1907.

## DEPARTMENT OF GEOLOGY

Changes of *personnel* in the teaching staff of the Department of Geology have been numerous in 1907. After over thirty years of successful teaching Professor W. O. Crosby was the first professor of the Institute to accept retirement under the Carnegie Foundation. He now is enabled to give all of his time to independent research, while retaining his office in the department. Assistant Professor D. W. Johnson resigned his position, owing to the demands of his work at Harvard University. Dr. R. A. Daly has been appointed to a newly established professorship of physical geology. Professor J. F. Kemp of Columbia University has accepted the position of Lecturer in Economic Geology for 1907-08, and will direct the advanced courses formerly given by Professor Crosby. Mr. de Steiguer, assistant, was obliged to go west in March, and he was succeeded for the spring months by Mr. William G. Ball (M. I. T. '05) and for 1907-08 by Mr. C. H. Clapp, of the same class.

Two students took the Bachelor's degree in Science in Course XII. in 1907. The number of enrolments in courses under the department for 1906-07 was 847, an increase of 24 over 1905-06. New graduate courses of research, partly for the S.M. degree, have been established in Geology of the Igneous Rocks, Advanced Field Geology, Advanced Economic Geology, Chemical Geology and Mineralogy, and Advanced Paleontology.

Through the kindness of the trustees of the Caroline A. R. Whitney estate the department will receive a sum of money for the purchase of a modern seismograph wherewith to register the vibrations of earthquakes. The instrument has been ordered, and will be mounted in a suitable locality near Boston. This gift marks the foundation of a research laboratory of physical geology. In the spring of 1907 thirteen thousand dollars was raised by subscription from twenty-eight individuals and corporations, to equip an expedition for the exploration of the Aleutian Islands, under the auspices of the department. This expedition was led by Professor Jaggar, and investigations were carried on for four months. Travel

was by sailing-schooner, starting from Seattle May 20, 1907, and returning to the same port on September 11. The economic resources, minerals, rocks, insects, plants, and physical features of the islands were studied, and collections brought back for investigation by specialists. This expedition marks a further advance toward the foundation of a research laboratory, one of the functions of which should be exploration of volcanic and seismic lands. A fund of five thousand dollars per year for five or ten years is needed to start the work of this laboratory and to maintain research assistants. It is hoped that eventually money will be provided to build a geophysical observatory.

On Oct. 1, 1907, Professor Daly assumed his duties at the Institute, having resigned his position as geologist for Canada on the International Boundary Commission. The change was made on the understanding that the completion of his report for the commission should hold first place among projects for his research work in the laboratories of this department. This final report will summarize the results of field and laboratory work of seven consecutive years which have been spent on the geology of the western Cordillera where it is crossed by the 49th parallel of latitude. The work is being carried on for the Canadian government. To facilitate the preparation of the report, Dr. W. F. King, the Canadian commissioner, has generously permitted the entire rock collection made during the boundary survey to be deposited in the Institute laboratory. The collection consists of about two thousand specimens, representing practically all the formations occurring on the 49th parallel between the Pacific and the Great Plains. Dr. King has also loaned from his government department a number of valuable instruments which will be used in the study of the rock collection. Among these is a large model Fuess petrographic microscope, provided with an unusually complete amount of accessory apparatus. As at present planned, the report will consist of a volume of text and an atlas of about thirty large plates. It is expected that its completion will occupy another year of more or less consecutive work.

During the past summer the mineralogical and petrographical

collections received many specimens, in part collected by members of the instructing staff and in part gifts from graduates and friends of the Institute. A fine suite of specimens illustrating the minerals and ores of Cobalt, Ont., and Butte, Mont., are perhaps the most important of these additions. Over two tons of specimens have been received. Such gifts are encouraging to the department, for they indicate a real interest on the part of graduates and friends, and not only make unnecessary the purchase of material from dealers at an exorbitant figure, but furnish specimens better adapted for use in the practical instruction of mining students. To the equipment of the mineralogical and petrographical laboratory has been added a large-sized polarizing microscope. This instrument is especially designed for refined work in mineralogical and petrographical research, and is a distinct addition to the research equipment of the department. Eventually several special attachments will be added to this microscope.

During the vacation Assistant Professor Warren made two collecting trips to points of interest in New York State and Nova Scotia. He was also engaged in various pieces of professional work. Two papers were completed by him during the summer: one a "Study of the Mineralogy and Petrography of Iron Mine Hill, Cumberland, R.I.," which has appeared in the January number of the *American Journal of Science*; the other a shorter paper on "Occurrence of the Rare Mineral Species, Hortonblite, at Cumberland, R.I.," to appear in the January number of the *Zeitschrift für Krystallographie und Mineralogie*. A third paper is practically completed on the "Metamorphism of the Cumberland Gabbro." This will, however, not be published until later. The class in mineralogy of the present year numbers approximately seventy-five men. The sections of this class for entirely successful work in a subject like mineralogy are too large unless two instructors are present. At the present time the assistant can devote only a small portion of his time to mineralogy, and it is recommended that an additional assistant, or possibly an instructor, be appointed in the future to co-operate in the instruction in mineralogy. The same man would be available and very serviceable in the petrographical



laboratory. Professor Warren considers it desirable to increase the available funds of the department to such an extent as to permit of the giving of a summer school in geology, mineralogy, and lithology. It is also to be hoped that some way may be found to provide a permanent fund, the income of which might be used for defraying the expenses of such students as are unable to go from lack of funds. The advantages of summer school work of this kind cannot be too strongly emphasized. It is a matter of great importance to the economy of time during the winter semesters that such subjects as geology, surveying, and mining become required summer studies. If this were done in the Institute, much of the overcrowding of courses in the third and fourth year would be avoided.

Among the gifts of fossil collections received by the department during the past year Dr. Shimer wishes to acknowledge especially the large collection of tertiary shells from Plum Point, Md., given by Mr. Fred L. Franks, a former student of the Institute. Another gift by the Philadelphia Academy of Sciences consists largely of lower tertiary forms. These collections fill a gap in the index fossil series, and also give material for research to graduate or fifth-year students. The book cataloguing of the fossils of the department is almost complete and will soon be transferred to a card system for greater convenience in use. This will be an important aid to both instructors and students. A portion of the past summer Dr. Shimer spent in giving two courses in the Yale University Summer School.

Dr. Loughlin has assumed charge of the courses in third-year field-work and building stones, and will co-operate with Professor Kemp in the advanced courses in Economic Geology. He is, this year, giving a course in General Geology at Tufts College in place of Professor J. S. Kingsley, who is on a year's leave of absence. Owing to increase of duties, he has resigned his position as compiler of foreign bibliography for *Economic Geology* to Mr. C. H. Clapp.

Mr. Charles H. Clapp, assistant for the year 1907-08, comes from North Dakota, where he has been since graduation, holding

the positions of Assistant State Geologist and Instructor of Mining and Geology in the State University.

#### MODERN LANGUAGES

Another reduction has been made in the Modern Language requirements for graduation. Students of Course VI., instead of taking a year of Intermediate French and a year of Intermediate German, will hereafter take only a year and a half of one of these subjects. The last half-year's course will comprise only two recitations a week instead of three comprised in the regular term. The undergraduate courses which up to date have reduced their requirements in Modern Languages are the 1st, 2d, 6th, 11th, and 13th.

#### DEPARTMENT OF ENGLISH

The English Department has extended, as far as time and money now allow, the system of frequent conference which it has always emphasized as essential for effective instruction. Each student in the first year is required to talk over his work with his instructor at least once in each period of five weeks; and in these conferences much can be made clear, questions may be asked and difficulties explained that can be treated in written criticism only indirectly or not at all. Conferences with second-year students at the same intervals afford opportunity to speak personally of such portions of the lectures as may seem to each student specially difficult or interesting, and to discuss the required readings and effective or ineffective ways of reading literature. To the student who desires help, conferences afford the best aid; to the teacher they afford opportunity for personal knowledge and for personal testing.

The inequalities of capacity among Freshmen, due largely to different degrees of efficiency in their preparatory schools, make difficult all instruction in large classes, wherein a portion must be delayed and a portion unduly hurried for the sake of the average. The Freshman Class in English was this year divided, on the basis of the entrance examination and two special tests, into three layers,—a stratification carried out in every section. All the students must

alike develop to an acceptable degree their capacity of written expression, but this division enables the better pupils to go further and the poorer to receive more and better adjusted assistance than under the old system.

A further step of adjustment is the formation of a special class, meeting at four o'clock, for pupils required to repeat first-year English. By this arrangement their Sophomore tabular view is not dislocated by the necessity of sacrificing some second-year subject to the hour assignments of Freshmen sections, and they may be treated as a special class.

The extra hours available for second-year English in several of the courses have been given to fuller treatment of earlier English literature, particularly to the period of Elizabeth and to fuller illustration of the lectures by required readings. Students read an entire play of Shakespeare ("Othello" or "Hamlet" in different sections), which is discussed fully in class.

The composition work done in the second year is also proving its value. In each term each member of the class is required to write a long theme, the purpose of which is to give him practice in handling abstract ideas in expository or argumentative fashion. In conference this theme is carefully gone over, particular attention being paid to its qualities as a piece of thinking, and then the student is required to rewrite it. By this training he is helped to see that precise and logical thinking is as necessary in his English work as in his scientific studies proper.

Mr. Allen French (Course IX., '92) is the first Institute graduate to be added to the department. He has had practical experience of literary work for periodicals and in published books.

#### DEPARTMENT OF DRAWING

A meeting of all the instructors in the Department of Drawing was held in the President's office on Wednesday, October 23. This was the first meeting of these instructors as members of a department, and was brought about in accordance with a recent recommendation of the Faculty. Meetings of the instructors have now been arranged for each month of the school year, to consider

questions relating to the instruction in Mechanical Drawing and Descriptive Geometry. The *personnel* of the department is of such character that the discussion of educational subjects is likely to be profitable.

During the summer Professor Adams has published a new and enlarged edition of the first part of his Descriptive Geometry, and is now engaged in the preparation of a second part which will be brought out before the end of the school year.

The changes in the instructing corps this year are the appointment of Mr. S. E. Gideon as full-time instructor and the appointment of Mr. J. Mills as half-time instructor. Mr. Mills comes to us from Western Reserve University, where he developed a course in Mechanical Drawing and Descriptive Geometry. Mr. Mills is a graduate of the University of Chicago, and received the degree of A.M. from the University of Nebraska in 1904.

#### DEPARTMENT OF MATHEMATICS

Professor Woods has represented the department at the recent conference of mathematicians and engineers at Chicago. This conference had been carefully planned by the Chicago section of the American Mathematical Society, the program having been in course of development for more than a year. There is a salutary general tendency abroad, as well as in this country, to adapt mathematical instruction more and more closely to the needs of the students of applied science, avoiding on the one hand such discussions of abstract mathematical theory as are appropriate for specialists and on the other hand a short-sighted subordination of fundamental principles of technical facility. This disposition is exemplified in England and in this country particularly by a larger use of concrete applications as an essential part of mathematical instruction and by the more or less complete breaking down of the traditional partitions between different branches of mathematics. Professor Woods's present active occupation with a revision of the Institute mathematics along these lines has rendered his participation in the Chicago conference especially appropriate.

At the recent organization meeting of the American Federation

of Teachers of the Mathematical and Natural Sciences at Chicago, Professor Tyler, representing the Association of Mathematical Teachers in New England, was elected president.

#### DEPARTMENT OF ECONOMICS

A volume entitled "National Problems" by Professor Dewey was published in October by Harper & Brothers. This volume belongs to The American Nation series and covers the period 1885-97. The chapters deal largely with labor, trusts, railroads, and money problems, as well as the foreign complications of the period.

Professor Dewey's "Financial History of the United States" has gone to a third edition.

The Department of Economics has been called upon to cooperate this year in the establishment of a new and promising experiment in sociology. Professor Carroll W. Doten, in addition to his regular duties at the Institute, is acting as head of the Research Department recently established in the School for Social Workers in this city. Under his supervision three subjects are being studied; namely, (1) co-operation in its various forms, (2) seasonal and irregular employments, and (3) inebriety. This last subject is being approached from two points of view, or, rather, is the point of departure for two separate lines of investigation, namely: the study of individual cases and the methods of treatment in hospitals, penal institutions, and under the probation system; and a careful inquiry into the effects of license and no-license in several Massachusetts cities under our local option law.

## THE UNDERGRADUATES

## THE HOLIDAYS

On Thanksgiving, students who could not be at their homes were invited to come to the Technology Club in the evening. Prof. Edward S. Morse gave a delightful talk on Japan, followed by refreshments.

On Christmas, students who could not go home were invited by the President of the Institute to a Christmas-tree entertainment at the Union. Mr. W. Lyman Underwood gave an interesting talk on Florida, gifts were distributed, and refreshments were served.

On Christmas Eve, Professor Arlo Bates read Dickens's "Christmas Carol" at the Boston Young Men's Christian Union, and Christmas music was furnished by the Commonwealth Male Quartette. Many Tech men were present.

## CONVOCATION

The first convocation of the year was held on December 12. Dr. Wilfred T. Grenfell spoke on the work of the Labrador and Deep Sea Mission.

## THE CLASSES

1908. The most important event for 1908 this fall was, of course, the annual class dinner. This was held at the Tech Union, Friday evening, Nov. 1, 1907. The class was particularly honored by having President Noyes as a guest. The other guests were Professor Swain and Bursar Rand. Kurt Vonnegut, '08, acted as toastmaster. The fellows gave President Noyes a grand welcome. He announced at the dinner that, beginning next September, the Institute will offer in every department courses leading to the degree of Master of Science.

President Noyes said that the Faculty has been aiming at the

institution of graduate courses for several years; but, owing to the large expansion which Tech underwent during the period of 1892 to 1904, it has been impossible to do so. This last year the enrolment remained about stationary, so that an opportunity has been given to offer the advanced courses.

President Noyes said: "In order to produce the highest type of engineer, it is very important that the student should have a somewhat different character of work than that given in the regular four-year course, which is crowded with subjects of a technical character, so that original research work cannot be taken up. It is unfortunate that Institute men feel that they are educated at the end of their course. They feel that they are completely 'done,' but they are 'done' only on one side.

"If you get an offer of a position as an assistant instructor, take it. The advantage is great, for an assistant instructor reviews the subjects he has so recently been over and drives them home. This work thus differs from graduate study, which allows research work and instruction for small classes. The opinion is apt to be rather prevalent that it is a year wasted, but I consider it as valuable as either one of the last two years of undergraduate work.

"Not enough men come to Technology to prepare for teaching positions. The Institute gets more demands for such positions than it can fill. The idea is somewhat prevalent that a man goes into teaching because he has not energy enough to go into practical work. But the best men enter it in spite of the fact that the financial gain is less, because they feel that the opportunity for service is greater. A man may each year lead a dozen or two dozen or only one or two young people into habits of thought which will determine their whole career. To a man who is naturally a student, the scholarly, intellectual life of teaching is more enticing than practical work."

President Noyes said, further, that the man who achieves the highest success not only carries along existing processes, but improves the old and originates new processes. That it is always hard to get time to do original work President Noyes admitted, but



he urged that it was the one thing to be striven for, and remarked that a man gets his salary for doing what he is paid for and gets his advancement for doing more work than he is paid for.

Professor Swain was then called upon. It was a few moments before he could speak, due to the cheers and applause. After calling attention to the need for closer relations between student and instructor and to the satisfaction which the teacher feels in the development of a student, Professor Swain spoke of the six qualities which he considers necessary for success, saying in part:—

“The first quality is judgment and tact,—the ability to thoroughly grasp a problem, see all its elements in their true perspective, properly weigh them and form a correct opinion as to the course to pursue, and then to follow that course in a way that will not call up criticism and ill feeling. This quality is paid for the highest.

“Second comes character, which consists of honesty, integrity, and all the other qualities of high character. It is hard to see which of these first two qualities is the more important; but it is certain that a man may be perfectly honest and yet, because he lacks judgment, be a failure.

“The third quality is a trained mind,—a mind trained in habits of thoughts which will enable it to take up any new problem and attack it successfully. No matter what training a man has received, with a trained mind he can do anything. There is one graduate of the Civil Engineering Department who is now a clergyman.

“Fourth, experience. It is less valuable than any of the other three, but still it is very valuable. A man with experience has a great asset, and this is the more valuable if he uses the experience of others.

“Fifth come personal qualities, by which I mean the personal attributes, manners, graces, and address, which tend to make a favorable impression; and, last, knowledge, which is the mere acquisition of facts in the mind.”

Then came Bursar Rand. He was tendered an ovation, for the Bursar will always be dear to the class of '08. He did not dis-

appoint the fellows, but told some rattling good stories. It was not until the end of his speech that he became serious. He then said:—

“After you have graduated, be loyal to Tech. Remember the good times and the Union. You’ll forget the hard lessons and the grind, but you’ll remember the pleasant things. We need your support and loyalty. President Tucker has truthfully said that the success of an educational institution is in the loyalty of its sons. Remember that just in so far as you succeed you reflect credit on the Institute.”

The Dean was unable to attend, and his absence was much regretted.

Then came the announcement of the class elections. The results were as follows: H. A. Rapelye, president; J. S. Barnes, vice-president; J. T. Tobin, secretary; B. L. Gimson, treasurer; Institute committee, M. E. Allen and T. W. Orr; executive committee, W. A. Barton and S. R. Daddon; Athletic Association, H. E. Allen, H. R. Callaway, B. L. Gimson, G. T. Glover, and J. T. Tobin.

Each of the new officers was then called upon to say a few words. President-elect Rapelye thanked the officers of last year for their good work. Between the speeches were rousing songs and cheers, and thus the most successful and enthusiastic dinner the class ever had came to an end.

The end of the enthusiasm was not yet, however. The fellows, formed in a column of fours, led by Harry Rapelye and “Spike” McGuigan, did a snake dance down to Rogers steps. Then followed more singing and cheering. The Bursar did the class the honor of driving by in his automobile with hat raised, and the fellows showed their appreciation. “Bill” Adams joined the class on the steps, and was given a good cheer. The cheer-leading by “Spike” McGuigan was a feature which seemed to hold the spectators spell-bound. He certainly did his best. Finally, after one last long cheer for Technology, the meeting broke up,—another happy memory for all the Seniors.

The Field Day this year was very successful, and was well handled

by the Advisory Council. George Glover, '08, as the only remaining undergraduate member of the council, did fine work. The following '08 men acted as marshals at the field: Barnes, Barton, Ford, Heilmann, Hoole, Loomis, McGuigan, Pierce, H. Putnam, E. T. Weeks.

In all branches of athletics the class is well represented. In track Captain Orr, Rapelye, Gimson, Blackburn, Schobinger, M. E. Allen, Howland, Callaway, and Batchelder, all veterans, form a nucleus for a good team next spring. Manager Ferris and Captain Howland have just closed a strenuous season of cross-country work.

In hockey Winthrop D. Ford, '08, has been elected captain. He is a fine player, and it is hoped that the team will receive better support than it did last year. In basket-ball Manager Whitmore, Pierce, and Lamont should make the team as regulars. The team promises to be an exceptionally good one. In fencing the class will be represented by A. Turner, formerly of Princeton, and Bounetheau, last year's captain. On the golf team Barcus and C. Turner have done good work. Coffin is manager of the tennis team, and P. R. Fanning president of the Tennis Association. The gym. team is working regularly in the gymnasium in preparation for its annual exhibition.

Under the leadership of George Glover, '08, the Athletic Association was reorganized and a new constitution drawn up, as it was felt that the old Association was inadequate. The new one has met the requirements very satisfactorily. George Glover, the originator, was elected president at the first meeting. He, together with John T. Tobin, '08, will represent the undergraduates on the Advisory Council.

A 1908 man, Conrad Westervelt, of Annapolis, who is studying naval architecture at Tech, wrote this year's Show, entitled "Over the Garden Wall." 1908 is glad to hear that James Francis will again coach the Show. He is well liked by all who know him. Kurt Vonnegut and Sando, '08, will probably again be in the cast.

The *Tech*, under the very efficient leadership of Harry Hoole, '08, has taken a new lease of life. Nothing but real live news will

satisfy Hoole, and in this work he is ably seconded by two other '08 men, Dolke and C. Turner.

The Musical Clubs, in which there are many '08 men, are working hard for their winter concert, which is near at hand.

H. A. Rapelye, '08, is president of the Institute Committee.

Hammer and Tongs elected G. C. Westervelt, '08, president, J. S. Barnes, '08, secretary, and C. Turner, '08, treasurer.

H. S. Osborne, '08, is president of the M. A. H. S. Club.

M. E. Allen, '08, is on the executive committee of the Walker Club.

The Electrical Society elected L. B. Hedge, '08, president, and W. E. Booth, '08, secretary-treasurer.

R. W. Parlin, '08, is president of the C. E. Society. The Program Committee consists of the following '08 men: Gerrish, chairman, Spurr, Tobin, Flaherty, Elton, and Whitmore. Smith, '08, and C. Putnam, '08, compose the executive committee. The society has had several meetings and a supper, all of which were very successful. President Parlin is working hard to build up a strong society. L. B. Hedge, '08, is president of the Tech Y. M. C. A.

The '08 Nominating Committee this year is M. E. Allen, chairman, Heilman, Glover, and Callaway. John T. Tobin, Secretary.

1909. The officers for the coming year are as follows: president, C. W. Gram; vice-president, M. J. Turnbull; secretary, D. G. Haynes; treasurer, J. I. Finnie; clerk, F. G. Taite; Institute committee, J. H. Critchett, M. R. Scharff; executive committee, H. I. Eaton, P. E. Young; Junior Prom. committee, R. H. Allen, A. L. Dickerman, C. J. Belden, W. W. King, C. H. Pope, A. L. Shaw.

The Juniors gave their first class dinner of the year at the Tech Union, November 16, with about one hundred men present. A. L. Moses acted as toastmaster. Dean Burton and Professors Dewey and Passano were the speakers of the evening. D. G. Haynes, Secretary.

1911. The following officers were elected at the Freshman Dinner, November 5: president, Eugene R. Davis; vice-president, Scott P.

Kimball; secretary, Willson Y. Stamper, Jr.; treasurer, P. A. Cushman; clerk, Harold M. Davis; Institute committee, Kester Barr, B. Lawrence; directors, K. W. Faunce, Norman DeForest; athletic association, E. G. Fitzherbert, Edward Van Tassel, Jr., W. J. Seligman, W. C. Salisbury, George A. Cowee.

On December 17 Acting President Noyes spoke to the class on the "Choice of a Course."

#### ASSOCIATIONS AND CLUBS

*The Institute Committee.*—The committee met on November 18, and the following officers were elected: Harry A. Rapelye, president of the Senior Class, president; Carl W. Gram, '09, vice-president; and T. W. Saul, '10, secretary and treasurer.

*Brotherhood of St. Andrew.*—A probationary chapter of the Brotherhood of Saint Andrew was organized on December 5 in the Parish House of Trinity Church. Three months will be required to test the efficiency of such an organization at the Institute.

H. E. Weeks, '08, was unanimously elected probationary director. R. H. Ranger, '11, was elected secretary.

All efforts of the probationary chapter will be centred in bringing men to a corporate communion at nine o'clock the third Sunday of every month.

*Catholic Club.*—Le Marquis Bouthillier Chavigny, an eminent Frenchman now visiting in America, spoke, December 17, before the Catholic Club on Louis Pasteur.

*Civic Club.*—The first meeting of the club was held October 18. The topic was "Compulsory Arbitration between Labor and Capital."

On December 5 the club discussed "The Examination System," J. R. Ruckman and B. L. Gimson for the affirmative and L. D. Nisbet and R. Ellis for the negative.

*Musical Clubs.*—The annual winter concert, held on December 19, was very successful.

#### TECH SHOW

The title of the Show for 1908 is "Over the Garden Wall." It was written by George C. Westervelt, '08, an Annapolis graduate taking

the course in Naval Architecture. The other writers who handed in plays were Ralph J. Batchelder, '08, A. H. Ginsberg, '09, and Henry A. Hale, '10.

The performances will be given as follows: April 18, evening, at Northampton; April 20 and 21, matinees, Boston; April 20, evening, Malden. The Boston performances will probably take place at the Colonial Theatre.

#### TEMPORARY WALKER MEMORIAL

A plan proposed by the *Tech* for the utilizing of the Grundmann Studio Building as a temporary Walker Memorial Building is being actively discussed and generally advocated by the student body. A petition covering fully the student side of the use of the Copley Hall Building as a temporary Walker Memorial or Union has been presented to the Executive Committee of the Corporation, the Faculty of the Institute, and the Walker Memorial Committee. This petition was drawn up and presented by Harry A. Rapelye, president of the Institute Committee, and Henry William Hoole, editor-in-chief of the *Tech*.

After calling attention to the present crowded condition of Rogers and other buildings, the petition brings out the following points in favor of the plan:—

*First.*—The overcrowded condition of the Mechanical Engineering Laboratories in the basement of Engineering Buildings A and B, and the desire to use the present Union for an adequate Chipping and Filing Laboratory. The placing of the Tech Lunch-room and the Union in the Copley Building would free a large floor room.

*Second.*—The need for the rooms now used for student interests in Rogers Building.

*Third.*—The inadequacy of the present lunch-room to cope with the problem of the feeding of 1,400 students.

*Fourth.*—The need of a common or lounging room.

*Fifth.*—The need of study-rooms for the lower classes.

*Sixth.*—The recurrent demand for small recitation-rooms, now felt for the second time by the Institute.

*Seventh.*—The advisability of trying out in some way the various



schemes for the arrangement of the permanent Walker Memorial Building.

*Eighth.*—The desirability of making the Walker Memorial Fund a live issue.

*Ninth.*—The pressing need of a greater social life among the Institute students.

*Tenth.*—The great need of such a building as the Walker Memorial Building at the present time.

*Eleventh.*—The need of an opportunity for the student to practise or see practised, at short range, the general principles of business on the lines laid down by Isaac W. Litchfield, '85, in his article on "Apprenticeship for Business Responsibility."

*Twelfth.*—The great need of nourishing and propagating a loyalty and spirit to and for Technology among the undergraduates in order to have that same loyalty in the future alumni.

A tentative plan for the use of the Copley Hall Building is given, including a dining hall, lunch-room, lounging or common rooms, a trophy-room, a place for the Frank Cilley Memorial Library, study-rooms for the lower classes, small recitation-rooms which could be used in the evening for dining-rooms for the societies, a "cage" and central post-office, headquarters for the Alumni Association, the *Tech*, the *Technique*, Tech Show, Musical Clubs, and the various committees.

The financial arguments against the idea are answered at some length, together with the argument that it is another temporary feature of the Institute buildings, as well as the students may.

Appended to the petition are resolutions from the Board of Editors of the *Tech*, the Institute Committee, the four undergraduate classes, the Tech Show management, the Board of Publication of *Technique*, 1909, the Technology Young Men's Christian Association, the Civil Engineering Society, the Mechanical Engineering Society, the Architectural Society, and the Walker Club, bringing out the need of such a building as the Walker Memorial Building, and the feeling that the Copley Hall Building should be used for such a purpose. Other societies and clubs have passed such resolutions, and committees are now at work drawing them up. These



organizations are the Mining Engineering Society, the class of 1907, the combined Musical Clubs, and the Chemical and Electrical Engineering Societies.

## ATHLETICS

### CROSS COUNTRY

Harvard defeated Technology, November 1, in the annual run.

Over two hundred undergraduates went to the Back Bay Station on November 25 to give the team a "send-off" on its journey to the intercollegiate races at Princeton. The race took place on November 27, and Cornell was victorious for the eighth time in nine years. Tech secured seventh place.

### FENCING

The Technology team was officially admitted, in October, to the Intercollegiate Fencing League.

On November 14 the club was formally organized with the following officers: Captain E. M. Loring, president; J. W. Nickerson, '09, vice-president; V. C. Grubnau, '09, secretary; F. J. Lange, '09, treasurer.

At the first interclass fencing meet, on December 2, '09 won first place with 15 bouts, '11 being second, and '10 third. V. C. Grubnau won the ribbon for individual superiority.

### BASKET-BALL

The first game of the season was played on December 10 with Boston College. Tech won, with a score of 71 to 8.

On December 14, in a game played in the gymnasium at Hanover, Technology was defeated by Dartmouth, the score being 37 to 21.

On January 1 Tech was twice defeated at Tufts, the score of the first team being 25 to 21 and that of the second team being 30 to 13.

### TENNIS

On October 5 the following officers of the M. I. T. Tennis Club were elected: president, P. R. Fanning; vice-president, J. Larned;

manager, L. Coffin; treasurer, J. Scheuer. M. T. Whiting, '08, defeated P. M. Wentworth, '09, in the finals of the singles of the fall tennis tournament, Whiting winning straight sets, 6-2, 6-1, 6-3.

#### GOLF

On October 16 Tech was defeated in the annual tournament of the New England Intercollegiate Association by Williams and Dartmouth.

## THE GRADUATES

THIRTY-THIRD ANNUAL MEETING OF THE MASSACHUSETTS INSTITUTE  
OF TECHNOLOGY ALUMNI ASSOCIATION, JAN. 10, 1908

The business meeting was called to order, at the Hotel Brunswick, by President Morss a few minutes after six o'clock.

The usual reports were read. Abstracts of these will be printed in a later number of the REVIEW. At the suggestion of Professor Richards, for the Committee on the Rogers Fund, it was voted that the note made by students receiving scholarship assistance from this fund be changed in form. It is hoped that under this new form the beneficiaries will pay back more promptly the assistance received by them, in order that the fund may be more widely useful. It was suggested that the number of vice-presidents of the Association be increased, in order to give organizations at a distance from Boston representation upon the Executive Committee. Under the constitution this had to be referred to the Executive Committee.

The meeting adjourned at 6.50 P.M. to the annual dinner, where gathered two hundred and fifty-three guests, graduates and past students. The invited speakers were his Excellency Curtis Guild, Jr., Governor of the Commonwealth; Dr. Arthur Amos Noyes, '86, Acting President of the Institute; Dr. John H. Finley, president of the College of the City of New York; Mr. Joseph P. Gray, '77, term member of the Corporation of the Institute; and Francis R. Hart, '89, Treasurer of the Institute. President Everett Morss, '85, of the Alumni Association, acted as toastmaster.

Among the invited guests were present from the Corporation Messrs. J. B. Sewall and Frederick P. Fish; from the Faculty and Instructing Staff, Dean Burton, Professors William H. Niles, Gaetano Lanza, Thomas A. Jaggard, Dugald C. Jackson, W. H. Walker, H. O. Hofman, Homer Albers, Robert Smith, Joseph Blachstein, and the Bursar, Frank H. Rand. The other guests were Mrs. William B. Rogers and Miss Porter, Mrs. Francis A. Walker, Mrs.

Silas W. Holman, Mrs. Alfred E. Burton, and Mrs. Everett Morss, ex-President J. M. Crafts, and Mr. and Mrs. George Wigglesworth.

President Morss, in opening the speaking, touched upon the statistics of the graduates. In this thirty-third year of the Alumni Association there are about thirty-nine hundred graduates. As the fortieth class has been graduated, the average is a little less than one hundred members per class. This average per class does not tell the whole story, for the first graduating class had only fourteen members, the smallest graduating class five members, and there have been nine classes with less than twenty members.

President Morss then explained the reason for placing beside each plate a copy of the *Tech*. He said: "There is a movement of great moment going on among the students for a temporary Walker Memorial, utilizing the Copley Hall Building, or Grundmann Studios, owned by the Institute and known in the old days as Winslow's Skating Rink, for this purpose. The need of such a building is great." He then introduced the governor.

Governor Guild, after telling several after-dinner stories, turned to the educational work and status of Massachusetts, saying in part:—

Massachusetts is proud of Massachusetts not only as a State, but as one of the United States. All must recognize the leadership of the Commonwealth in citizenship. Massachusetts is, perhaps, proudest of its education. It is proud of Rogers. It boasts of the finest agricultural library in the country, outside of Washington, in the little agricultural college at Amherst, of the finest electrical laboratory in the world at the Worcester Polytechnic Institute, and of the finest naval construction course in the world at the Institute of Technology. Our young men who wish to learn ship construction no longer have to go to France or England, as in former days, for instruction and naval plans.

To show the standing of the Institute abroad, I will speak of a Scottish member of Parliament, from Ayrshire, who is sending his son to the Institute of Technology for the course in electrical engineering. This Scotchman told me that he sent his son here because he wanted the best course possible. We must not push this technical education too far. We must teach history, philosophy, and other broadening studies. As ex-Governor Russell once said, "We must not teach how to make a living, but how to make a life." The expert machinist may become a burglar, the expert

accountant an embezzler, the professor may use his knowledge to fool the people, if none but the purely professional things are taught. All must have a broad training to become citizens. To have a democracy, there must be intelligence. The schools must turn out men so educated that Tammany Hall and machine politics would become impossibilities.

The problems of technical education will not be solved by introducing sloyd courses in the lower schools, but by giving such instruction in special institutions, like the Worcester Polytechnic Institute, the Massachusetts Institute of Technology, the agricultural colleges and technical schools. The common school education as it has been must be conserved. These special schools must turn out men equipped for expert work in their profession, and educated also for citizenship. It is my sincere hope that the Institute will hold to this. This State of Massachusetts is a restricted bit of real estate. It has no natural advantages, no gold mines, no iron mines, no forests, little soil; but in spite of this its history is not unworthy. These disadvantages have taught Massachusetts to cultivate brains. For the future history to be worthy, Massachusetts must not only train the skilled brain of the leader, but the skilled hand of the artisan.

President Morss, in introducing Dr. Noyes, said that, if there were "nothing doing on the moving question" and if there were no new buildings, there is hope. He continued: "A year or so ago Dr. Noyes was elected Chairman of the Faculty. Many asked why he had been elected. The answer seems to be that they were preparing to utilize him as acting President."

Dr. Noyes's speech on "Education in Engineering and Applied Science at the Massachusetts Institute of Technology" follows:—

Much as the matter has been discussed during recent years, it has seemed to me that there was no more important subject on which I could speak to you to-night than the principles underlying the Institute's system of education in engineering and applied science; for the relations of its field of work to that of other institutions can be understood, and its lines of future development can be properly provided for, only when those fundamental principles are appreciated. I shall incidentally speak of the educational progress of the past year.

The higher education of men for the engineering or scientific professions involves three kinds of educational experience:—

First, such studies, student activities, and social surroundings as give breadth of view and scholarly interests and develop in the student the personal qualities essential to cordial and effective relations with other men.

Second, a thorough knowledge of the fundamental principles of those sciences upon which the future profession depends, a training in scientific method, and a development of the power of investigating scientific problems.

Third, specialized knowledge and practice in the branch of engineering or applied science constituting the profession itself, and original work in solving practical problems or in designing new structures or machines.

These three sides of professional education I will for brevity designate the general training, the scientific training, and the engineering or technical training.

Let us consider now how the different types of institutions aim to meet these three requirements. The college, by its Bachelor-of-Arts course in the humanities and in the generalities of science, offers what from the Institute's standard of work represents about three years of general training. The university schools of medicine or engineering then take these Bachelors of Arts, without adequate scientific training though perhaps with some scientific knowledge, and give them in a period of three or four years more a combination of scientific and technical training. The Institute, speaking generally, may be said to devote the first two and a half years of its courses to a combination of general and scientific training in not far from equal proportions, and to give the last year and a half to engineering or technical training.

Without undervaluing the opportunities which the preliminary collegiate course affords to certain types of students and for certain professional ends, let me recall to you some of the distinct advantages of our own system of education. In the first place, we believe that, aside from its professional aspect, the supplementing of general studies by a scientific training in the first three years gives a broader culture and a better preparation for life than the usual college course where the instruction in science is made subordinate; for we hold, in the words of one of our American psychologists, "Science is the chief factor in culture and in life." We believe, too, that the co-ordination of general and scientific studies throughout a single course gives better results rather than the plan of having the one precede the other. We question even the correctness of the fundamental principle of the university plan that the early years of a young man's education should be devoted to the requirement of culture and the later years to scientific and technical

training. We believe the opposite plan is the natural one. The young man must be thoroughly *trained* in the earlier years—to work hard, to think clearly, to express himself well, and to attack and solve problems; that the expansion of his mental horizon which constitutes culture must be a gradual process going on through all the years of his study and through his subsequent life. At the age when young men enter upon higher education the mental organism is fast losing its plasticity and is setting into the form which it will retain forever; and there is no time to lose in moulding into it those habits of thought and habits of work which are essential to the accomplishment of great results. We, therefore, prefer to show our students at once “the steep and thorny way” to success rather than to afford them opportunity to wander in the “primrose path of dalliance.” If at the end of our course we can send our men forth with well-developed faculties, with high ideals and earnestness of purpose, and with sufficient general education to realize the variety of human activities, we can safely trust to the future years of contact with the world and to natural development to bring added breadth of view and that intangible quality which is called culture. We hold, too, that, while the student should be given the freest choice as to the profession and the branch of the profession for which he wishes to prepare himself, we are the better judges of what special studies are adapted to give him that preparation. We believe in offering a large choice of courses with options within those courses, but not in the unregulated elective system. Finally, we should appreciate the great advantage of our sound student life and the possibilities of further developing it under conditions which will not introduce the evils that often attend it in the colleges.

I have discussed these characteristics of our undergraduate courses because it is important for us all to realize that the Institute has a field and system of education of its own in which it is highly successful. Some of the older alumni seem to have the feeling that students at the Institute miss something rather essential which a college course would give them. This feeling arises, I believe, from the failure to realize that much of what they themselves missed on the social side is now in large measure provided for by the great development of student life which has taken place within the last ten years, and that, if they do miss *something*, they got more than its equivalent in acquiring the solid qualities which the college course so often fails to give. It is an interesting fact that the college men upon our Faculty who have had experience with both systems of education are the heartiest believers in our own.

It is, of course, true that a larger amount of time than four years could



with advantage be devoted to each one of the three sides of our professional education; and we must offer additional opportunities in these directions.

It must, on the one hand, be distinctly recognized that we cannot hope to give in this period the specialized knowledge and the training in investigation that it is desirable that the fully educated engineer or scientific expert should have; and we must make obvious to all students the importance of returning for a fifth year in order to secure these advantages. During the present year an important step in this direction has been taken by announcing in almost all departments a large number of subjects of instruction (over sixty in all) dealing with the more advanced topics and the recent developments of engineering and applied science, such, for example, as the design of structures in re-enforced concrete and of railroad and hydraulic works, the study of gas engines and steam turbines, the design of dynamos and power stations.

An advanced course made up of such subjects and of investigation work will remedy the difficulty of insufficient engineering training; but it is also, I believe, important for the Institute to offer to its students another type of five-year course which will enable those who can afford the time to secure a broader general training and a more thorough scientific foundation. A plan for accomplishing this, which is under consideration by a Committee of the Faculty, consists in offering a three-year course in general science made up partly of required and partly of elective subjects of such a character that the student who has completed it can enter the third year of any of our regular courses and finish it in two years more. By thus replacing the first two years' work by three, he will have the opportunity of including a much larger proportion of studies of a general and fundamental character. Such a three-year course carried on by the methods and in the atmosphere of the scientific school can hardly fail to be more cultural in the truest sense than the usual college course taken upon the elective plan without a definite professional aim in view.

While it is highly desirable to offer to our students such opportunities as these for a broader as well as for a more thorough and specialized education, I believe the results of our four-year course are at present sufficiently satisfactory to make it unwarranted to *require* for our Bachelor's degree a longer term of study than four years,—at any rate, so long as the cost cannot be materially reduced; for we should thereby further limit the number of young men who are able to educate themselves for the scientific professions. I hold this belief the more strongly because the possibilities of our four-year period have not as yet been fully realized. It is, therefore, to in-

creasing the effectiveness of our undergraduate instruction and to improving the social and physical conditions of our student life that our attention must be mainly devoted; and with the solution of these problems the Faculty and its administrative officers are engaged. Because we of the Faculty are earnest believers in the plan of education for which the Institute stands and in the kind of training which it affords, it must not be thought that we fail to realize that there are many defects in our execution of that plan and many individual cases in which an adequate training is not secured.

Let me mention briefly some of the steps which have recently been taken or are under consideration for attaining better results. A somewhat radical change has been made in the curricula of our engineering courses through the omission of the second-year work in modern languages; and the time thus gained has been utilized to increase the amount of instruction in English and history and to give a more thorough drill in fundamental engineering subjects, especially in applied mechanics, structures, and steam engineering. It is felt that few engineers make practical use of their knowledge of modern languages, and that the general and scientific studies that have been substituted are not only more directly useful, but either have a higher cultural value or provide a better mental training.

A plan for securing closer individual contact between students and their instructors and for assisting such students as have special difficulties has been entered upon to a limited extent during the present year. The instructors in English and mathematics meet each first-year student individually several times during the term and discuss the work together. It is hoped this conference plan and the plan of smaller sections may be greatly extended. The additional expense which it has so far involved has been met by an appropriation from the alumni contribution.

Another development of the undergraduate work which is under consideration is the requirement of summer work for four or five weeks in the summer following the first and second years. To the summer would be transferred some of the laboratory practice, drawing, shop work and field work, thus giving time for more general studies, for more thorough work in fundamental subjects, and for relieving the pressure which is excessive at certain periods in our courses.

The development which student activities have undergone within recent years is perhaps not appreciated by many of the older alumni, who are apt to picture the Institute as they knew it during their own student days. This development has, moreover, been in the main a thoroughly healthy one; and there is to-day in our student body a loyal, earnest, democratic

spirit such as exists in few institutions. Their activity has been well illustrated during the past two weeks by the vigorous agitation, on the part of a dozen different student organizations, for the use of the Institute Building on Clarendon Street, now occupied by the Copley Society, as a social and dining hall, which might serve temporarily the purposes of the Walker Memorial Building. This suggestion should receive the careful consideration of both Corporation and alumni; for, if financial provision for it can be made and a just arrangement with the Copley Society can be effected, it has much to commend it. It will afford a general and readily accessible gathering place for all our students. In it meals can be furnished at low cost of better quality and under better social conditions than those afforded by the cheaper class of boarding-houses. Rooms can be made available for the offices of the general student organizations, such as the *Tech* and *Technique* boards, the Tech Show management, the musical clubs, and for the meetings of other student societies. Perhaps the most important consideration of all is that this temporary experiment will give us at small expense a most valuable experience, which will enable us to make more perfect arrangements for the permanent Walker Memorial.

What I have said will, perhaps, serve to show you that, even though it has been necessary to delay for a time the large physical development which is essential to the full success of the Institute and to its future welfare, yet in the two most important respects—the improvement of our work of instruction and the creation of satisfactory conditions of student life—we are steadily moving onward. And if we all have faith that the Institute has an educational mission of its own; if, without being blind to its imperfections and the many opportunities for improvement we realize that it has a rich inheritance from the past in its standards of work, its methods of instruction, and the earnestness of spirit of its students and its teachers; if we have confidence that its work is of such importance to the industrial interests of this country and this State that, when the need arises, it will be adequately supported; and if, counting on this support, we face courageously and with unshaken resolution the problems of development which confront us,—there is every reason to believe that the Institute will continue to hold that pre-eminent position in the field of scientific and technological education which will alone satisfy the expectations of its alumni.

In introducing Dr. Finley, of the College of the City of New York, President Morss brought forward the fact that that college is the only one in the country supported by a city, and also that it is one of

the colleges forced to meet a problem similar to that which the Institute is now facing, that of moving to a site farther removed from the crowded section of a big city. President Morss called upon Dr. Finley to give the alumni a little advice on the question of moving the Institute.

Dr. Finley opened his speech in the conventional manner of the New Yorker before a Boston audience, saying, "I am appalled by Boston and this Boston audience, made up of people who know everything about something, while I make a business of knowing something about everything." He then quoted, "Boston presents a terrifying aspect of æsthetic discrimination." He would not speak on the moving problem of the Institute, as he did not know enough about the circumstances of the case, but preferred rather to speak on what was uppermost in his mind, the training of the city youth. He said in part:—

Who is this that is to be educated, who is this person to be trained? It depends upon the viewpoint. The physician looks upon this youth as a complex machine, made of a number of intricate parts, a machine which he attempts to keep running, repairs when broken down, tries to keep from breaking down. To the lawyer this youth is one that has not as yet come into his legal rights. To the guardian of the peace, the policeman, this youth is known as a potential mischief-maker, a human automobile that is liable at any moment to exceed the speed limit. To your Dr. Dewey this youth is a consumer or a producer. To the manufacturer the youth is a hand, to the banker a brain, to the poet something that has just come out of paradise, to the preacher a soul. To the teacher this youth is all these, the complex machine, the mischief-maker, the soul, the brain, everything. Carlyle defines youth as a being caught between two eternities, the past and the future, running away from the first, blind to the second. Yet these millions of youths will have our sun, our moon, will have the earth in which our dust will be.

Dr. Finley said he had been told that the city and the country boy are very different. He could not see the difference. The mere environment was not of vital importance in this case. People went to hear and enjoyed the roar of Niagara, but were vexed at the roar of the city; did not mind the dirt of the country road, but were worried by a little dust on the city pavement; admired the cliffs and canyons, but were displeased with the sky-

scraper,—the feelings being merely fashions. The speaker believed that the moral environment in the city was better than in the villages and small country towns. It was hard for him to believe this, but he had drawn the conclusion only after securing an amount of testimony from persons in outlying districts. Dr. Finley said, "There is to-day life as debased on the slope of the mountain as there is in the shadow of the sky-scraper."

Dr. Finley did not believe that the old common school of the city and of the country, the old country academy, are sufficient. The city is growing, is persistent, is tyrannous. He cited an incident of his speaking to a graduating class of a school in New York in which there were more boys than in the whole United States at the time of Washington. The increase in population he brought out from a statement of an immigration official, who said that in every hour there are eighteen more people in New York than in the preceding hour. With this great growth it was the youth that would share the city.

"We boast of what we spend on education," said Dr. Finley, "yet for the individual it is no more than if we sent each on a trolley ride each day." The speaker felt that the most important service of a generation was the carrying of the knowledge of that generation to the next. If teachers were paid commensurate to their services, the pay would be so large that people would flock into the profession, and it would no longer be a profession, but a trade, because these people would be doing it for monetary gain. The ideal for the teachers Dr. Finley gave: "For their sakes, I sacrifice everything." This ideal and instinct the colleges should develop more.

In closing, Dr. Finley hoped that, if the Institute moved at all, it would not move so far away from the city that the poorest boy and poorest girl might not reach it.

Joseph P. Gray, '77, term member of the Corporation, said:—

We have been received into the Corporation in a most cordial manner. At present there are a number of vital questions before the Corporation, the Faculty, and alumni. The two great questions are that of the site and the presidency. The site question has been set back by the financial depression. The presidency question has been settled, temporarily at least, by the appointment of Dr. Noyes as Acting President. Who knows but this will permanently settle the question? I want here to pay a slight tribute to Dr. Noyes, who has most ably served under most trying circumstances.

Francis R. Hart, '89, then spoke a few words on the Income Fund in connection with the Institute finances. The figures he gave were for 1906, \$42,583, and for 1907, \$46,588, making a total of something more than \$89,000 turned over to the Institute by the Fund Committee. The application of this money Mr. Hart explained by reading portions of the Treasurer's report for the past year.

The following gives the portion referring to the Income Fund:—

It is proper to make special reference to the great assistance furnished by the Income Fund Committee. Had the whole of the money contributed from this source been used for this year's expenses, this report would have shown a surplus of several thousand dollars instead of a deficit in the current expense account, but it was felt that the wishes of the alumni would best be carried out by devoting their gifts, as far as possible, to special matters of development rather than to mere maintenance. Accordingly, besides paying during the past year for special apparatus for the Mechanical Engineering Department and for the Electrical Engineering Department, and besides salary payments to strengthen the instructing staff, there has been reserved the sum of \$10,000 to be applied during the coming year to certain special purposes, such as the purchase of a steam turbine and the extension of the plan of personal conferences between first-year students and the instructors, in which matters various alumni have expressed a special interest.

The Walker Memorial contributions are technically held as a separate fund, and are not strictly to be included in the accounts of the Institute, but for the information of the alumni there is given in the present report a list of the securities held for that fund, and a statement of its total amount, which with accrued interest at the time of this report is \$112,033.40.

The Treasurer then spoke of the mutual advantage of the Income Fund, the practical benefit to the Institute, and the benefit to the association in making it more interested in the Institute, having a unifying influence on the body of alumni.

In regard to Copley Hall, Mr. Hart said that everything of interest to the students was of interest to the Corporation and alumni, and that consideration of the proposal had already begun. In the consideration of it there were other things than the mere taking over of this building to be thought of. He pointed out that the Copley



Society had expended much money in improving the hall, and that in this the Institute had participated. Mr. Hart felt that there were moral equities to be considered. He felt that there was a possibility of compromise with the Copley Society, in which certain portions of the building could be used for the best interests of the students.

Walter B. Snow, '82, the new president of the association, was called upon, and spoke of the great services that Mr. Morss had rendered to the association and the Institute in his capacity as president and as chairman of the Income Fund Committee. He also spoke of the scope of the twenty or more Technology clubs in the middle and west of the country, and the great need of much spirit and co-operation in the coming great reunion.

#### ASSOCIATION OF CLASS SECRETARIES OF THE M. I. T.

ELEVENTH ANNUAL MEETING, NOV. 22, 1907

The eleventh annual meeting and dinner of the Association of Class Secretaries was held at the Technology Club, Boston, on Friday evening, Nov. 22, 1907. Following the dinner, the business meeting was called to order at 7.50 P.M., and Walter B. Snow, '82, was chosen chairman for the evening.

The minutes of the previous special meeting of April 5, 1907 (at which arrangements were made for the annual Commencement celebration), and the financial report of the year, were read by the secretary and approved. Owing largely to the successful management of the annual Tech Night Pop Concert, which the Association has undertaken for the past three years, our funds have been substantially increased, the profits from each concert having been sufficient to leave a good balance for the treasury after paying the Association's share of the general expense of the Commencement celebration, such as printing, postage, clerical work, and the like. At the beginning of the annual meeting of 1906 the Association had a balance of \$580.39, this amount being increased during the meeting to \$955.72 by the payment of \$375.33, the net proceeds of the 1906 Commencement celebration. During the year the Association has received contributions from classes amounting to \$130.50;



interest, \$52.10; and the net profits from the 1907 Commencement, amounting to \$308.54. The expense for printing, postage, stationery, clerical work, and messenger service, has been \$26.52, leaving a balance on hand at the close of the financial year of \$1,420.34.

The report of the Committee on Publication of THE TECHNOLOGY REVIEW was presented by J. P. Munroe, '82, managing editor, as follows:—

In the last annual report it was stated that Mr. Edward G. Thomas, '87, had accepted a position upon the Board of Publication in place of Mr. Leonard Metcalf, resigned. Early in the year, however, Mr. Thomas removed to New York, and, much to the regret of the other members, found it necessary to sever his connection with the board. The vacancy thus created has not yet been filled, mainly for the reason that, since the coming year must see a reorganization of the management of the REVIEW, it seemed best to make no selection at the present time.

Since the Institute, pending the selection of a new President, has not entered upon any large policies of development, the volume of the REVIEW for 1907, like that for 1906, is mainly a record of the current work of the Institute and of the doings of past and present students. The total number of pages, however, is greater by 38 than in Volume VIII. That interest in the publication has not flagged is indicated by the fact that the number of new subscribers has been 356, while over 86 per cent. of the old subscribers have been retained.

In spite of an increase in the cost of printing and a considerable falling off, as was predicted last year, in receipts from advertising, the cost of Volume IX. has been kept within the current income. To do this, the October number had to be made unusually small. For the coming year, however, the Association must seriously face the question of securing a greater revenue. With that problem in view the board has conferred with Mr. Rand, Bursar of the Institute, in regard to the possible placing of the whole advertising question, as it concerns the REVIEW, the *Quarterly*, the *Architectural Record*, and the various student publications, in his hands, in order that the matter may be put upon a definite basis and in order to avoid the soliciting of friends of the Institute by more than one advertising agency. His heavy duties at the opening of the term have prevented him from perfecting a plan; but it is hoped that he may see his way to carry out some arrangement through which the income of the REVIEW from advertising,

heretofore dependent upon the personal efforts of the Board of Publication, may not only be considerably increased, but may also be put upon a dependable footing.

Although the very great efficiency of the clerk has so systematized the work of the REVIEW that the duties of the managing editor have been reduced to those mainly of supervision, he yet feels that he cannot, in justice to other demands upon his time, much longer carry the responsibility involved. He begs, therefore, to present his formal resignation, to take effect at such time during the coming year as it may be found possible to make other arrangements for the REVIEW. In doing so, he desires to express his very hearty and grateful appreciation of the cordial way in which every one connected with the Association of Class Secretaries and with all departments of the Institute has co-operated in carrying forward the periodical. Without this ready and unstinted aid the work would have been impossible.

Professor C. Frank Allen, '72, moved that the report of the Committee on Publication be accepted, the motion being seconded. The chairman called attention to the fact that the acceptance of the report meant the acceptance, also, of the resignation of the managing editor. Speaking upon the motion, Everett Morss, '85, president of the Alumni Association, paid tribute to the work of Mr. Munroe upon the magazine, and said that, while every member realized that the success of the publication had been due in very great measure to the devoted and efficient work of the managing editor, they also appreciated the fact that after nine years of such service it was only just that the editor should be relieved of his duties; and, while every one deeply regretted the necessity for such action, he believed that the meeting should accede to Mr. Munroe's request and accept the report and the resignation. The report was accepted by unanimous vote.

Mr. Munroe suggested that the selection of a managing editor be left to a special committee of seven or nine, to consist of the secretary of the Association, the Committee on Publication (four members), and others to be named by the chairman of the meeting. Upon motion of Professor Allen it was voted that the matter be left to a committee of seven, the membership of the committee to be in accordance with Mr. Munroe's suggestion. The chairman

named for members at large upon this committee Mr. Morss and Professor Allen.

The report of the 1907 Commencement Celebration Committee was presented by the chairman, Mr. Morss, and accepted. The report of the sub-committee on the Pop Concert was presented by L. W. Pickert, '93, in the absence of R. H. W. Lord, '05, chairman, and was also accepted. Mr. Pickert read a list of suggestions for the guidance of future Pop Concert committees; and he read, also, a letter from Dr. Francis H. Williams, '73, suggesting that, as the older alumni are not familiar with the Tech songs, it might be well to select a few of them, print them with music, and circulate them among the classes for use at the smaller gatherings, so that at the Pop Concert all alumni would know the songs and join in the singing.

A general discussion was held upon the subject of the Tech Night Pop Concerts. It was the sense of the meeting that in the last two or three years our Tech Nights have become too strenuous and noisy. Such enthusiastic demonstrations as those of the 1907 concert, which were started by some of the younger graduate classes and taken up by the undergraduates and others, cannot be pleasing to our guests in the balconies; and it was feared that, if persisted in, they would cause men of the older classes to stay away on account of the noise. The failure of the alumni at this year's concert to join in singing the Tech songs was commented upon, and was thought to have been due to the fact that the songs are new and are unknown to most of the alumni, and that for some reason only a few men were able to obtain that evening the printed copies of the words of these songs. It was suggested, further, that the holding of class dinners just before the concert might be a disadvantage, and that possibly it would be better to have those dinners on the preceding Monday night.

It was felt that by better organization and careful management great improvement may be effected in future concerts. The early appointment of a committee to make preliminary plans for the 1908 concert seemed desirable. It was suggested that the songs to be sung next year be selected very soon; that they be printed

and widely circulated among the alumni, who should be urged to sing them at their class meetings; and that the undergraduates be asked to practise them during the year at their frequent meetings at the Tech Union. Then, by having at the concert some one with a strong voice to lead the singing and by having sub-leaders scattered throughout the floor, it was thought that the singing could be made a very successful feature of the program. The cheering should be organized, and it should be understood that there was to be no cheering during the music. Speaking for the undergraduates, H. A. Rapelye, '08, president of the Senior Class and of the Institute Committee, said that by beginning now he felt sure that the undergraduates can be made to appreciate the situation, so that at the next concert they would not indulge in any objectionable demonstrations. Mr. Pickert said that in each graduate class the secretary has power to wield his class on every occasion; that, if each class secretary were instructed as to what was expected of him and of his class, there was no danger of over-enthusiastic demonstrations at any concert.

I. W. Litchfield, '85, moved that the chairman appoint a committee of fifteen, including the next president of the Alumni Association as chairman, to take full charge of all arrangements for the 1908 Commencement except those for the alumni reception to the graduating class. Professor Allen moved to amend the motion to provide that the chairman of the meeting should act as chairman of this committee until the new Alumni Association president was elected. The amendment and the motion were seconded and carried by unanimous vote. The chairman has named the following 1908 Commencement Celebration Committee: W. B. Snow, '82 (chairman), E. C. Miller, '79, B. R. T. Collins, '88, Harrison Loring, Jr., '89, C. F. Park, '92, L. W. Pickert, '93, H. W. Hayward, '96, N. J. Neall, '00, M. L. Emerson, '04, F. H. Hunter, '02, H. A. Rapelye, '08, J. T. Tobin, '08, D. G. Haynes, '09, C. C. Webb, '10, W. Y. Stamper, Jr., '11.

Professor J. F. Norris made a report upon the general spread of all classes which was held at the Technology Club on the afternoon of Commencement Day. This last year it was decided to

make the spread of particular interest to the women of the Institute, to whom special invitations were sent, as this seemed the best opportunity among the Commencement functions for the women to meet their fellow-alumni. A fair representation of the four hundred Institute women were present, and many men came also, so that the second and third floors of the club were well filled. It was suggested that, if the general spread is to be repeated next year, it would be desirable to give up the first floor of the club wholly to the men of the alumni, and to use the second floor for both the women and men, as was done this year.

Mr. Munroe brought up for discussion the question whether graduates of the old School of Mechanic Arts, formerly connected with the Institute, should be made eligible to election to associate membership in the Alumni Association. Although this school was properly of preparatory grade, its students took a certain amount of undergraduate Institute work under Institute teachers, and received upon graduation certificates signed by the President and Secretary of the Institute. In a number of instances graduates of this school have achieved prominence and are better educated than many Tech men who were at the Institute only one year, and among the mechanic arts graduates are to be found some of Technology's most loyal friends. Mr. Morss spoke highly of the *personnel* of these graduates, and said that the matter had received the consideration of the Alumni Association's executive committee, by whom it had been decided that, inasmuch as these men had not really been a part of the Institute, it seemed unwise to change the constitution of the Alumni Association so as to make them eligible to election to associate membership. No action on the proposition was taken by the meeting.

F. H. Hunter, '02, suggested that it might be possible and desirable to give an evening performance of the Tech Show in Boston, in order that the alumni might have a better opportunity to attend the production. C. C. Webb, '10, who is connected with this year's Show, thought that in the three days of Junior Week there was not the opportunity for an evening performance unless the out-of-town performance be dropped. Upon motion of Mr. Hunter it was

voted that the chairman appoint a committee of three to confer with the Tech Show Committee, and to get the opinion of alumni upon the matter of an evening performance of the Tech Show. The chairman appointed upon the committee F. H. Hunter, '02, Bryant Nichols, '07, and C. C. Webb, '10.

It was voted that for the ensuing year the Technology Club of Northern Ohio and the Rocky Mountain Technology Club be represented, by their secretaries, upon the Committee on Closer Relations among Graduate Organizations. To this committee was referred the suggestion of Mr. Hunter that it might be possible to organize a Technology Club at Detroit.

The meeting adjourned at 10.18 P.M.

Attendance, twenty-nine.

FREDERIC H. FAY, *Secretary*.

#### TECHNOLOGY CLUB OF NEW YORK

The following extracts are from a circular dated Oct. 1, 1907, which was widely mailed to Institute men in and about New York:—

The suggestion was made last winter that the Alumni Association of the New England colleges should co-operate in erecting a building which would afford to their alumni adequate club accommodations (for Amherst, Brown, Dartmouth, Technology, Wesleyan, and Williams), and committees were appointed to consider the feasibility of such a plan. Representatives from these committees have held frequent meetings during the past five months to discuss the proposition and formulate a plan to present to their respective associations. It is the opinion of this committee that it is financially practicable, and should be put into operation as soon as possible. This circular is being sent to the alumni of all the colleges represented at the conference, in order to obtain a general expression of opinion before bringing the matter before the various associations.

The primary object of a college club in this city is to bring together the younger graduates coming to New York each year, to provide a place where they may live with reasonable economy, meet the older alumni, and keep alive their college interest and spirit. . . .

It is now proposed that the alumni of the six colleges unite in purchasing a site in the club district north of Forty-second Street and erecting a suitably



equipped and modern club-house, the building to be nine stories in height, with a frontage of not less than fifty feet, and with its general arrangements as follows:—

On the two lower floors are to be located the office, dining-room, café, billiard and card rooms, and in the basement squash courts, kitchen, the mechanical plant, and laundry.

On each of the next six floors are to be a general club-room and from fifteen to twenty living-rooms, these to be known as Club Floors, the top story to contain sleeping-rooms for the use of non-resident members.

The building is to be built and owned by a holding corporation to be organized for this purpose, about sixty to sixty-five per cent. of its cost to be carried on a permanent first mortgage, and the balance raised by the sale of second mortgage bonds, issued in small denominations and sold to the alumni of all the colleges, of whom there are about five thousand living in New York and vicinity. . . .

It is then proposed that each of the six colleges represented form separate clubs, and that each club shall lease one of these club floors for its exclusive use, reserving the club-room for the general use of its members and renting the sleeping-rooms to those who wish to live at the club. The lower floors are to be used by all the clubs in common, the dining-room to be arranged, if desired, with large tables for each club and smaller tables for general use.

Arrangements could be made by which the dining-room on certain evenings could be reserved exclusively for one of the colleges for its smokers and dinners.

The general management of the building would be in the hands of a joint committee representing all the clubs. . . .

You will greatly oblige the undersigned committee by communicating with the representative of your own college, stating whether or not you are in favor of the proposed plan and adding any suggestions which you may have in regard to it.

ALBERT H. WALKER, Amherst, 32 Liberty St., N.Y.

ALFRED B. MEACHAM, Brown, 59 Wall St., N.Y.

A. B. CLARK, Dartmouth, 100 Broadway, N.Y.

ALLSTON SARGENT, Technology, 1135 Broadway, N.Y.

HORACE D. BYRNES, Wesleyan, 141 Broadway, N.Y.

HENRY R. CONGER, Williams, 40 Wall Street, N.Y.



## TECHNOLOGY CLUB OF THE MERRIMACK VALLEY

The fall meeting and supper of the Technology Club of the Merrimack Valley, held Dec. 5, 1907, at the Franklin House, proved to be one of the most successful affairs ever conducted by this society.

About thirty members from Lowell, Haverhill, Manchester, N.H., Salem, and Lawrence, gathered around the festive board; and all did full justice to the sumptuous menu provided by Proprietor Dickie and an efficient corps of waiters.

The speaker of the evening was Henry A. Morss, of Boston, commodore of the Corinthian Yacht Club of Marblehead.

Mr. Morss, in a stereopticon talk, graphically described the yacht race to the Bermuda Islands last summer, under the auspices of the Corinthian Yacht club.

The talk was hugely enjoyed by the jovial company, and was very well delivered, Mr. Morss being in a position to fully describe the race, as his private yacht "Dervish" took the first honors.

President R. A. Hale officiated as chairman for the evening, and seated around the banquet table were the following:—

DeForest Lambert, '99, Salem; John H. Lambert, '98, Lowell; Walter S. Coburn, '97, Lowell; W. O. Hildreth, '87, Lowell; E. F. Simpson, '90, Lowell; John Alden, '77, Andover; Daniel Adams, '06, Lawrence; George L. Wright, North Andover; George F. Hobson, '06, Lowell; John Boyd, '97, Lowell; John A. Faulkner, '76, Lowell; Arthur S. Thomas, '06, Manchester, N.H.; Charles H. Eames, '97, Lowell; William K. Fairbanks, '97, Lowell; Linwood O. Towne, '78, Haverhill; George Bowers, '75, Lowell; Edward B. Carney, '93, Lowell; Henry A. Morss, '93, Boston; George A. Nelson, '77, Lowell; and Richard A. Hale, '77, George W. Hamblet, '88, William F. Walker, '06, W. H. Clough, '04, John A. Collins, '97, John Ashton, James Lanigan, Jr., Philip R. French, '00, P. F. Ripley, '00, I. E. Beach, '94, of this city.

JOHN A. COLLINS, Jr., '97,  
67 Thorndike Street, Lawrence, Mass.

## TECHNOLOGY CLUB OF NEW BEDFORD

The annual meeting of the Technology Club of New Bedford was held at the home of T. B. Akin on Thursday, November 7. Ten were present. E. B. Hammond was elected president for the ensuing year, and Chauncey G. Whiton a member of the executive committee. A committee was appointed to arrange for the annual dinner in December.

The annual dinner of the Technology Club of New Bedford took place on December 5 at the Wamsutta Club. Thirteen were present, but this did not seem to detract from the pleasure of the evening. Dean Burton was the guest of the club, and gave an interesting talk on the present and future conditions of Tech. President Hammond presided. Those present were Hathaway, Beaman, Pierce, Allen, Lawton, Akin, Whiton, Hammond, Tillinghast, E. Wing, Wade, C. Wing. Stetson, '99, who has been in Portland, Ore., with the lighting company there, is now on his way back after a trip to Honolulu and Mexico.

CHARLES F. WING, JR., *Secretary*,  
34 Purchase Street, New Bedford, Mass.

## TECHNOLOGY CLUB OF NORTHERN CALIFORNIA

At a reunion dinner in Oakland, Cal., on November 16, twenty-eight Tech men organized a "Technology Club of Northern California," to advance Technology's interests and create a strong Tech fellowship on the coast.

These twenty-eight men represent only a small section of the Institute graduates in that vicinity; but the movement is not only sanctioned, but strongly desired by every Tech man that it has been possible to communicate with.

It is therefore expected that the immediate membership will be over forty. Charles G. Hyde, '96, was elected president. Any communications as to Tech men in this region will be gladly received by H. C. Blake, '07, the secretary of the club.

On November 30 the men of the southern part of the State, following the example of their northern neighbors, organized a similar club, and it is the intention to spread the movement until eventually there is formed an association of the Pacific Coast.

HOWARD C. BLAKE, '06,

2536 Bancroft Way, Berkeley, Cal.

#### TECHNOLOGY CLUB OF CENTRAL PENNSYLVANIA

The first meeting of the alumni of the Massachusetts Institute of Technology residing in Central Pennsylvania was held at the rooms of the Engineers' Club, Harrisburg, on Wednesday evening, November 6, 1907. The gathering was called by Messrs. L. E. Johnson, '89, and Stephen Badlam, '00.

For a number of years Harrisburg has been the common meeting ground for quite a body of Tech graduates, owing to the fact that its being the capital city of the State has made it the headquarters of the various State departments of water, health, highways, etc. Surrounding it also at various distances are the industrial towns of Steelton, York, Lebanon, Carlisle, and Burnham, which all have their quota of Tech men.

At different times, attempts have been made to effect some organization among the Tech men, but unsuccessfully, largely due to the lack of some suitable meeting-place, until last November, when the Engineers' Club of Central Pennsylvania kindly offered the use of its club-rooms for the purpose.

Postal cards, requesting a meeting of those interested, were sent out to some twenty men, and on the appointed evening sixteen gathered around the board in the grill-room of the club.

Harrisburg was represented by Farley Gannett, '02, K. C. Grant, '02, Paul Hooker, '02, F. E. Langenheim, '02, all of whom are with the Water Supply Commission.

Steelton answered the roll with George P. Vanier, '85, L. E. Johnson, '89, J. W. Campbell, '98, Timothy J. Driscoll, '99, Stephen Badlam, '00, E. L. Chapman, '10, John R. Brownell, '01, Frank A.

Robbins, Jr., '02, Richard V. McKay, '06, Benjamin F. Mills, '07, H. A. Frame, '07.

York was represented by Robert S. Beard.

After some light refreshments the proposition was broached to make the organization a permanent one, and was carried by acclamation. Mr. L. E. Johnson took the chair as temporary chairman, and, after calling the meeting to order, was nominated for president, and Mr. Stephen Badlam for secretary-treasurer; and both were unanimously elected. The secretary was then instructed to prepare a constitution, to be submitted to the members at the next meeting, which it was voted be held some time during the first half of December.

When the short business session was over, the company again applied themselves to sociability, and, with Grant presiding at the piano, made the rooms ring with the Tech songs that are so familiar to the more recent graduates, but which were all new to most of the older ones.

The evening closed with the proposition that the crowd get together again as soon as possible, and everybody went home glad of the opportunity of renewing his associations with "Old Rogers."

STEPHEN BADLAM, '00, *Secretary-Treasurer*,  
309 Pine Street, Steelton, Pa.

#### THE TECHNOLOGY CLUB

The annual meeting of the club was held Oct. 24, 1907. Reports of the treasurer and secretary were read and accepted.

Following the meeting, Professor Samuel C. Prescott, of the Institute, gave an illustrated talk on "The Problem of Milk Supplies for Large Cities." Interest in the talk was increased, owing to the present agitation for purer milk. With the help of lantern slides, which were evidence of much research work, Professor Prescott explained very clearly just what were the factors of the milk problem. He also exhibited samples of the various constituents and forms of milk. The audience contained members and friends directly interested in the milk business. A lively discussion fol-

lowed the talk. On the second evening and the first ladies' night of the season, November 5, Mr. William Lyman Underwood told of his "Journeys with an Indian." These journeys included visits to the cities of Boston and New York, as well as to the retreats of the Maine woods. Beautiful lantern slides were shown of the latter, and the contrast of the strong character of the Indian against the surroundings and civilization of the city was marked and instructive.

On the third evening, November 21, Mr. Henry A. Morss, '93, gave a talk on "The Bermuda Yacht Race of 1907," illustrated by many lantern slides. As he was the winner of the race, the story of how he prepared for it and how it was run was unique.

Dr. Ernest F. Henderson gave a smoke talk on December 17 on "Liberty or Death in the French Revolution." With the help of lantern slides of the numerous but representative original records, monuments, and prints which he had located and studied in various parts of France, Dr. Henderson gave a simple and convincing picture of the terrible ordeals of the Revolution.

On December 31, the fifth evening and second ladies' night of the season, Mr. Henry C. Wilson gave a lecture on "Rome." This was very fully illustrated by stereopticon slides of landmarks, and brought out vividly the life of that ancient city.

ANGELO T. HEYWOOD, '06, *Secretary*,  
83 Newbury Street, Boston.

## NEWS FROM THE CLASSES

1868.

PROF. ROBERT H. RICHARDS, *Sec.*, Mass. Inst. of Tech., Boston.

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In regard to the class of '68 a few members got together and had lunch at Technology Club and attended the field day sports together. They were Hon. Eben S. Stevens, Eli Forbes, and R. H. Richards. They had a very good time talking over old times, and only wished that more of the class could have been present.

1873.

SAMUEL E. TINKHAM, *Sec.*, 60 City Hall, Boston, Mass.

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Samuel M. Felton, '73, former president of the Chicago & Alton Railroad, has been elected president of the Mexican Central Railway Company. Mr. Felton is noted as a railroad man, and had been at the head of the Alton road since 1899. In 1868 he began his railroad career, and he has been connected in official capacity with sixteen different railways.

1875.

E. A. W. HAMMATT, *Sec.*, 10 Neponset Block, Hyde Park, Mass.

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I understand that Sam Allen is now located in Boston, and that H. L. J. Warren's address is care of Ind. Telephone Company, Salt Lake City, Utah.—I was greatly surprised and pained to learn of the death at Chicago on Nov. 21, 1907, of our classmate Edward A. Handy. Handy was born April 4, 1855, at Barnstable, Mass., and graduated from the M. I. T. in the class of 1875. He spent one year (1877-78) on the instructing staff at the Institute, and then began his railroad work with the Atchison, Topeka &



Santa Fé Railroad. In 1880 he was locating engineer for the Mexican National Construction Company (Southern Division), and in 1881 held the same position on the Northern Division, becoming chief engineer in 1883. In 1888 he returned to the States, and became division engineer on the Lake Shore & Michigan Southern Railroad, being made chief engineer in 1891 and general manager in 1906. He leaves a widow and two sons. A more extended notice appears on page 144.

1877.

RICHARD A. HALE, *Sec.*, Lawrence, Mass.

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C. F. Lawton is superintendent of streets and sewers at New Bedford.—W. L. Hallett has returned to his permanent residence at Denver, Col.—The secretary presided at the winter meeting of the Merrimack Valley Technology Club at Lawrence on December 5, when about thirty members were present. Commodore H. A. Morss, '93, gave an account of the yacht race from New York to the Bermudas, illustrated by lantern slides. A detailed account of the meeting is given elsewhere.

1882.

WALTER B. SNOW, *Sec.*, 170 Summer Street, Boston, Mass.

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After an illness of only a few days, Edward Gardiner Gardiner died at his home, 131 Mt. Vernon Street, Boston, on Nov. 4, 1907, at the age of fifty-three years. He was born in Boston, and was a son of the late Edward Gardiner. His mother was formerly Miss Mifflin, of a well-known Boston family. Gardiner took his degree in biology, and for a time after graduation taught at the Institute. He served with distinction in connection with the biological laboratory at Woods Hole, Mass., was deeply interested in the project for a Massachusetts Zoölogical Society, and among the first interested in the work and purposes of the Massachusetts Cremation Society. He married Miss Jane Hooper, who survives him, as do also a son



and a daughter.—Rufus F. Herrick gave an illustrated lecture on “Denatured Alcohol,” with special reference to its application in the arts, before the regular meeting of the Society of Arts held on Jan. 9, 1908.

1884.

PROF. W. L. PUFFER, *Sec.*, 307 Equitable Building, Boston, Mass.

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Gill has recently read a paper upon “The Explosion of Commonly Occurring Substances” before the Syracuse Section of the American Chemical Society. While there, he gave an account of the progress of the Institute before the newly formed Technology Club of Syracuse. He had the pleasure of visiting both the works of the Eastman Kodak Company at Rochester and the General Electric Company at Schenectady.—A very nice letter from Park has been received by the secretary, in which he tells of his doings, and says that the fire and earthquake did not get him, and that he now is in Palo Alto, where he would be glad to see any of the boys who may be out that way.—Puffer gave a very interesting paper on the “Variables of Illuminating Engineering” before the Boston Section of the Illuminating Engineering Society, which gave rise to much discussion, as it dealt with questions as to whether or not any given illumination was “satisfactory” or not to the user, without regard to the theoretical results or expectations.

1886.

PROF. ARTHUR G. ROBBINS, *Sec.*, Mass. Inst. of Tech., Boston.

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The class of '86 held a reunion at the University Club, Thursday evening, January 9. The special feature of the occasion was a complimentary dinner given to Dr. Arthur A. Noyes, Acting President of the Institute. Besides Acting President Noyes, there were present Locke, of the Corporation, Bartlett, Clifford, Miller, and Robbins, of the Faculty, and Anthony, Chase, Cobb, Cole, Doe, Jones, Lloyd, Peirce, R. J. W. Smith, S. F. Smith, and

Winsor, making the largest class meeting since graduation. The secretary presented the greetings received from classmates in all sections of this country and from foreign lands. Peirce officiated as toastmaster, and recalled that he acted in a similar capacity at the Freshman meeting of the class a quarter of a century ago. Peirce was in his happiest mood, and succeeded in bringing nearly every one present to his feet for some word of greeting, reminiscence, encouragement, or advice. Noyes gave a very interesting account of student activities, and told to how great an extent they had been developed since our undergraduate days. Locke spoke enthusiastically of the results which have followed, and which are likely to come from the recent alumni representation on the Corporation. Bartlett, Clifford, and Miller gave a hopeful account of the work being done and the improvements made in the courses of instruction. All three praised unstintedly the work of the new President. Bright and pleasing remarks, chiefly of a reminiscent nature, were made by Anthony, Jones, the two Smiths, and Winsor. The meeting ended with rousing cheers for Noyes, for '86, and for Technology.

1888.

WILLIAM G. SNOW, *Sec.*, 1106 Penn Mutual Building, Boston.

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Henry J. Horn spent a few days in Boston recently, *en route* to Europe. He has resigned from the Northern Pacific Railway, of which he has been general manager for several years.—Stone & Webster have removed their entire force to their new building, 147 Milk Street, Boston.—B. G. Buttolph and William G. Snow attended the recent meeting of the American Society of Mechanical Engineers in New York.—W. L. Belser has returned from Cuba, where he has been engaged in engineering work on one of the sugar plantations.—Mrs. Lilian G. Whaley (*née* Currier) has removed to 16 Charlotte Street, Boston.—H. C. Moore is now with James Beggs & Co., 109 Liberty Street, New York.—Odin B. Roberts has formed a partnership with George L. Roberts, Reuben L. Roberts, and Robert Cushman, under the firm name of Roberts,

Roberts & Cushman, for the practice of law, particularly in causes relating to patents, trade-marks, trade rights, and copyrights. The offices are at 95 Milk Street, Boston.—William G. Snow is giving a course of lectures on heating and ventilating to the third-year architects at the Institute.

1889.

PROF. W. E. MOTT, *Sec.*, Mass. Inst. of Tech., Boston.

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W. M. Beaman has a daughter, aged about nine months. He has recently returned to Washington, D.C., for the winter after a busy season in the field as “inspector of topography,”—a promotion recently made, and one that puts him in charge of topographic work of the Geological Survey in the Southern and South-eastern States, including Oklahoma and Texas. The “Beaman Stadia Arc,” manufactured by Gurley & Co., is now on the market.—Colonel Z. W. Bliss was a prominent candidate for the nomination as lieutenant governor of Rhode Island during the late campaign. That his standing among Democrats, as well as in his own party, is high, is clearly shown by the following abstract from the *Providence Journal*:—

It is pointed out by those who are talking of Mr. Bliss for lieutenant governor that his record as a Republican official in his town, Cranston, and as its representative in the legislature, gives him a certain title to higher place. It has been as chairman of the House Finance Committee that his public career has been the most conspicuous. His steady, conscientious attention to the trying duties of that position has saved the State many thousands of dollars (Democrats and Republicans alike, who have tried to coax appropriations out of him for little projects for their respective communities, will bear voluminous testimony to that), and then again it is cited that under his guidance of funds that are allotted by the legislature many worthy projects have been greatly benefited. . . . In many ways Colonel Bliss is talked of with favor, and some of the leading citizens of his town yesterday afternoon hailed it with delight. There he has been right at the head and front of every public movement, and it is generally accepted throughout the town that to him belongs practically all the credit

for getting the cross-town line for the working people of opposite sections of the town.

—The following extract from the *Tech* needs no comment, and will be read by all '89 men with interest:—

Francis R. Hart, vice-president of the Old Colony Trust Company and a former student of the Institute in the class of 1889, was appointed treasurer. He becomes also an *ex-officio* member of the executive committee of the corporation, and will probably become a member of the corporation itself.

—P. R. Hawkins declines to put himself on record at this time, and closes his letter by reference to the old maid, "getting less desirable and more particular."—H. Howard's return to Boston after a summer spent in racing in German and Spanish waters was chronicled in the last number of the REVIEW. A recent paper has the following:—

Henry Howard, of the Eastern Yacht Club, who had charge of the American yachting interests in the recent international races in Germany and Spain, has returned to Boston. In discussing these events, Mr. Howard said that the American boats were beaten at Kiel because they were not fast enough.

"In Germany," he said, "they met boats which had been designed with the lines of our boats of the year before as a guide. The Germans are wonderfully clever, and they turned out boats exactly adapted to the kind of weather met at Kiel in August. That weather is heavy. We had but one heavy-weather boat, the 'Spokane.' In what we would call an ordinary blow she was as fast, I think, as any of the German boats. In Kiel weather she was not.

"One mistake in our boats was the size of the cockpits, which were too large. A small cockpit and high combing are necessary to keep out the sea at Kiel. Our boats were drowned out. The German boats were better built, also, and did not leak.

"The German boats were all well sailed, their crews showing marked ability in handling them in rough weather."

In explaining the American defeat in Spain, Mr. Howard said that it was

due to the fact that the Americans waived an important clause in the agreement; namely, that the boats should be designed and built in Spain.

"We were defeated by boats designed in America, and that took the edge off the defeat a little.

"I think you may fairly say the Spanish match was won by the off-the-wind work. If their sails had been as good as ours, they would have made even a better showing. The king sailed in some of the races, but did not use his suit of American sails presented him last winter by the Eastern Yacht Club, as they were on his old boat 'Mouriscot,' which was not entered.

"Everything in both matches went off most pleasantly, there not being any hitch of the slightest kind. A return match may be sailed in 1908 or 1909. There is no doubt that the Germans will come again. They have offered us the lines of their boats, as we did them ours, and are looking forward with enthusiasm to coming. The Spaniards are also prepared to come."

—The firm of Kilham & Hopkins has recently let the contract for a new high-school building in Salem, Mass. The building "will cost complete about \$240,000, and, while fulfilling all the requirements of the school, will thus only require the expenditure of about two-thirds of the appropriation of \$350,000, owing to the very economical and compact arrangement of the plan. The city will be able to furnish the building without any additional expense. The proposed building will be built of red water-struck brick with trimmings of terra-cotta, in the Georgian style of architecture, and will stand on an eminence about thirty feet above Highland Avenue, and will be reached by an exedra and handsome steps executed in concrete. It will contain class-rooms and recitation-rooms for 864 pupils, with an assembly hall capable of comfortably seating 1,400 persons. There will be completely equipped chemical, physical, and botanical laboratories, a large room for domestic science, manual training, and mechanical and freehand drawing, and exceptionally fine library accommodations. All the plumbing and heating and ventilating apparatus will be of the most up-to-date description."—Montgomery Rollins has retired from active banking business and is devoting himself to the literary side of finance. He is lecturing on Practical Banking before the Tuck

School of Administration and Finance, Dartmouth College, besides publishing standard works and magazine articles on the above subjects. His books upon Bond Values, etc., have recently been followed by a work entitled "Money and Investments."—G. C. Whipple has in preparation a book on typhoid fever.

1890.

GEORGE L. GILMORE, *Sec.*, Lexington, Mass.

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Mr. A. H. Rogers is now residing at 32 Sidlow Road, Brookline, Mass.—Mr. E. S. Worden is at 15 Dey Street, New York City.—Mr. H. E. Hayes is at 43 Summit Avenue, Brighton, Mass.—Mr. A. W. Woodman, who recently removed to Chicago, may be found at 108 Lasell Street.—Mr. William P. Flint is at 5623 Wellesley Avenue, Pittsburg, Pa.—Professor George E. Hale is at the Mt. Wilson Solar Observatory, Pasadena, Cal.—Mr. E. B. Raymond is being congratulated upon the arrival of a small boy in his family.—Mr. H. P. Spaulding has closed his bungalow at Gloucester and is now residing at 17 Strathmore Road, Brookline, Mass., and has also opened a studio at 82 Studio Building, Boston, Mass., this fall.—Colonel Hayden has resigned as director of the Balakala Mining Company.—Under the recent change in the State militia force Major Hayden has been promoted to the rank of colonel and is chief of the pay department of the State militia.—Mr. Guy C. Emerson's address is Corbett, Wyo.—Professor Gary N. Calkins has been giving a course of Lowell lectures, which were finished early in December, on the Protozoa.

1892.

PROF. WILLIAM A. JOHNSTON, *Sec.*, Mass. Inst. of Tech., Boston.

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William H. Messenger, who is assistant engineer, Bureau of Highways, Borough of Brooklyn, recently visited the Institute with his bride.—Frederick L. Rhodes, engineer with the American

Telephone & Telegraph Company, has been transferred to the New York office of that company, 15 Dey Street.—Charles F. Wallace, with Stone & Webster, and Dwight P. Robinson, vice-president and general manager Stone & Webster Engineering Corporation, are now located at 147 Milk Street, Boston.—R. H. Sweetser resigned his position as superintendent of Blast Furnace, Algoma Steel Company, Sault Ste. Marie, Ontario, in November, to become superintendent of the Columbus Iron & Steel Company. On his way to Columbus on November 14, he was in the bad wreck on the Canadian Pacific Railroad near Moor Lake, Ontario, and lost his baggage in the burning of the baggage car. Besides his personal effects, notes, records, etc., he lost a solid silver tea service which the employees of the Blast Furnace Department had presented to him the night before.

1893.

FREDERIC H. FAY, *Sec.*, 60 City Hall, Boston, Mass.

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1908 marks the fifteenth anniversary of the graduation of the class, and plans now under way for a fitting celebration of the event in June will be announced in due season. An informal class dinner will be held on Saturday evening, March 14, for which notices will be sent to all members. At the annual dinner of the Alumni Association on January 10 the following '93 men were present: S. A. Breed, W. E. Evans, F. H. Fay, G. B. Glidden, H. M. Latham, W. A. Marcy, H. A. Morss, L. W. Pickert, C. W. Taintor, J. S. Wadsworth.—Albert Farwell Bemis is the newly elected vice-president of the M. I. T. Alumni Association for 1908 and 1909.—Charles E. Buchholz is located at Watertown, N.Y., as a dealer in coal, his address being 11 Sterling Street, Watertown, N.Y.—Nathaniel R. Craighill is professor of engineering in charge of the School of Engineering of the University of Montana at Missoula, Mont.—Carleton E. Davis, department engineer of the reservoir department, Board of Water Supply of the City of New York, is located at 189 Fair Street, Kingston, N.Y.—Herbert N. Dawes is



a charter member and director of a new commercial club recently formed in Boston, whose objects are to study and discuss the application of scientific principles to the conduct of business, especially to the sale of goods, to secure for salesmanship recognition as a profession, and to supplement all efforts to make Boston a greater commercial city.—Arthur Farwell gave a lecture recital on American music, December 17, before the Waltham Musical Club.—Ira J. Francis is manager of the Los Angeles office of John A. Roebling's Sons Company at 1932 Hobart Building, Los Angeles, Cal.—Edward M. Hagar, president of the Universal Portland Cement Company, has moved his office from the Monadnock Building to 1434 Commercial Bank Building, Chicago.—George T. Hanchett, consulting electrical and mechanical engineer, is located at 237 Fulton Street, New York City.—Frederick H. Howland, journalist, late war correspondent in South Africa and in China, for many years connected with the *Providence Journal* and later editor of the *Tribune* of that city, is engaged in the peaceful occupation of a planter at Los Palacios, Province of Pinar del Rio, Cuba.—Simeon C. Keith, Jr., for a number of years bacteriologist for H. P. Hood & Sons of Charlestown, now gives his whole attention to his private practice as a bio-chemical engineer. His office is in the Ford Building, 15 Ashburton Place, Boston.—George E. McQuesten is a director and one of the incorporators of the Aëro Club of New England, organized in November last, to promote the interests of ballooning and the navigation of the air. Professor A. Lawrence Rotch, Tech '84, director of the Blue Hill meteorological observatory, is president of the club.—Early in October L. W. Pickert spent a week in the wilds of New Brunswick, moose-hunting. Pickert says he shot his moose, although by some of his friends it was said to be "only a dream."—The address of William S. Resor, general foreman of the construction department of the Chicago Telephone Company, is 435 South Humphrey Avenue, Oak Park, Ill.—Arthur A. Shurtleff, landscape architect, 22 Congress Street, Boston, is consulting architect for the Metropolitan Improvements Commission, a commission appointed last year by the State to investigate and report upon the development and beautification of the Boston

Metropolitan District.—Charles R. Walker is chemist with Richards & Co., Limited, the Boston Artificial Leather Company, and the Celluloid Zapon Company at Stamford, his home address being 54 Suburban Avenue, Stamford, Conn.

WALTER SHERMAN WHITING

Walter Sherman Whiting, who attended the Institute for over a year as a member of the class of '93, met with a distressing accident October 30, and died Nov. 2, 1907. Whiting was born in Camden, N.J., Oct. 11, 1866. His parents were Stephen Betts Whiting and Kate Burr Whiting. When still a young boy, his family moved to Pottsville, Pa., and, shortly after he became of age, to Cambridge, Mass. In the autumn of 1890 he entered the Sophomore Class at M. I. T., as a special student in the civil engineering department. He spent about three terms at the Institute, and left some time in the autumn or winter of 1891-92. While at Technology, Whiting's many talents made him much sought after by the different musical, athletic, and social organizations. He was a member of the Glee Club, Theta Xi Fraternity, and the K. O. S. Sophomore Society, and he played right half-back on '93's Sophomore eleven. He was always a genial and interesting companion, particularly to those who, like himself, were lovers of music.

After leaving Technology, Whiting went to Calumet, Mich., as a member of the engineering corps of the Calumet & Hecla Mining Company, and remained at this work until the winter or spring of 1894. In March of that year he married Miss Maude A. Clinton, daughter of the late Charles Clinton, of Hoboken, N.J. He then went to Shamokin, Pa., and joined the mining engineering corps of the Philadelphia & Reading Coal and Iron Company. Later he was transferred by that company to the Pottsville district. After a time he left that company, and joined a friend in forming and conducting the Pottsville Supply Company.

While still at Pottsville, in September, 1900, he received and accepted an offer to go to Milwaukee, Wis., as treasurer of a com-

panty that was being organized there. Although this company did not materialize, shortly after reaching Milwaukee Whiting became interested with a Mr. Brown in organizing, financing, and operating the Brown-Corliss Engine Company, with shops at Corliss, Wis. He was first treasurer and, later, president of this company. Some time in 1905 he lost his office in the company through a change in its ownership. From that time until his death he owned and operated a storage warehouse in Milwaukee.

On Wednesday evening, Oct. 30, 1907, Whiting remained late at his warehouse, with a number of his men, on account of an unusual volume of business. He was driving home from there alone, when in some way he was caught between two tracks, and was run down by a freight train. Apparently, the accident was not known to the crew of the train, as he lay there, exposed to the drizzling rain, probably for about three hours, he being discovered, in an unconscious condition, by railroad employees about midnight. He was immediately taken to a hospital. Both legs were badly crushed and were immediately amputated, one just above and the other below the knee. Although he recovered consciousness, he could not survive the shock of the accident and the operation, and he passed away Saturday morning, November 2. Funeral services were held at his parents' residence in Cambridge. He leaves a widow, two sons, and two daughters.

A. F. B.

1894.

PROF. S. C. PRESCOTT, *Sec.*, Mass. Inst. Tech., Boston, Mass.

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The class was represented at the annual meeting and dinner of the Alumni Association by M. S. Chace, N. Cheney, Breed, Lawrence, Piper, Tenney, and Prescott. It was especially pleasant to see Chace after his long and interesting experiences in Japan as technical adviser to the Japanese navy department, and he gave those who were present most picturesque accounts of his life in Japan, as well as on his various travels. During the past four years Chace has encircled the globe three times. In returning to

America the last time, he came by way of the Trans-Siberian Railway to Russia, and thence to England and across the Atlantic. Chace has also spent considerable time in China, has visited India, and is in general well informed and familiar with affairs in the East. He expressed the opinion that the sending of the fleet around the Cape to the Pacific is a wise move on the part of the government. Of the others present, Cheney is chief draughtsman for Stone & Webster, Lawrence is superintendent of the Thomas G. Plant Shoe Factory, Piper is superintendent of the Boston Rubber Shoe Company, Tenney controls the lighting of Malden and other suburbs on the north side of the city, and Breed and Prescott still retain their positions at the Institute.—George Taylor is connected with the construction department of the General Electric Company of Schenectady, and has recently been engaged in work for the company in Illinois.—H. A. Swanton has an office as mechanical engineer at 123 Oliver Street, Boston. He also writes poetry from time to time, and has recently written some verses entitled "Technology for Aye," which fit the swing of our now famous "Stein Song."—N. H. Janvrin is located at Walden, N.Y., on the work of the new water supply for Greater New York.—McKibben is reported as enjoying his new duties as professor of civil engineering, and has become very popular, according to private advices received by the secretary.—Tufts has become an exponent of the outdoor life, and has a farm at Meredith, N.H., where his family spends the greater portion of the year. With his large interests in Boston and at Pinehurst, N.C., Tufts leads a very active and busy life.—Kirk has removed from Cleveland to Brooklyn, and his present address is 100 Buckingham Road.—Meade has his office at 2 Rector Street, New York, having moved from 26 Broadway.—Bailey is now mechanical engineer for the Mellin's Food Company of Boston.—C. H. Johnson has established a very enviable reputation because of the very skilful service he rendered in the preparation of the Panama Canal relief map exhibited at the Jamestown Exposition. In addition to this Johnson had charge of the Massachusetts exhibit. The members of the class will also congratulate him on his marriage, which took place recently.—R. D. Reynolds is now residing

in Sharon, Mass.—Sherman writes: “Born Oct. 17, 1907, Barbara Sherman. We now have a fine little family, consisting of two girls and a boy. . . . Change address to 206 Park Street, Akron, Ohio.”—W. A. Soley has removed his business office to 444 Harrison Avenue, Boston.—J. H. Gardner is now with the New England Steamship Company at Newport, R.I.—H. N. Parker is with the United States Geological Survey. For nearly a year he has been located in Kansas, making a special study of the waters of that section, but his permanent address is in Washington.—A. M. Burt is also in Washington, in the office of the supervising architect.—Coolidge has left New York, and is now to be addressed at 259 South Clinton Street, Chicago.—Noa is studying and travelling abroad. When last heard from, he was living in Charlottenburg, Berlin.—Prescott attended the meetings of the American Association for the Advancement of Science and the affiliated societies held in Chicago the week after Christmas. He presented three brief papers at the meetings of the Society of American Bacteriologists, of which he has been for two years secretary. As he has now retired from this position, it is hoped that he may give more time to the affairs of the class of '94. While in Chicago, he was splendidly entertained by Price. As a rubber expert, Price has developed a splendid business, both in manufacturing and consulting lines. He retains his old-time enthusiasm for Tech, along with a very broad interest in general affairs. Last summer Price took a trip to Alaska and the Pacific Coast, and had a most enjoyable outing. He expresses great interest in ballooning, and is a member of the Chicago Aëro Club.

1895.

H. K. BARROWS, *Acting Sec.*, 6 Beacon Street, Boston, Mass.

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Changes of address are reported as follows: F. C. Schmitz, care I. T. Williams & Sons, 11th Avenue and 25th Street, New York.—T. M. Lothrop, Indiana Steel Company, Gary, Ind.—John W. Cooke, Yuba City, Cal.—W. D. Bliss, 15 Second Street, San Francisco, Cal.—C. A. Meserve, 209 California Avenue,

Avalon, Pittsburg, Pa.—F. C. Green, 42 Broadway, New York.—C. L. Parmelee, 90 West Street, New York.—W. H. Winkley, 93 Water Street, Boston, Mass.—C. F. Tillinghast, Box 892, Providence, R.I.—L. W. Ballou, 17 Harris Avenue, Woonsocket, R.I.—S. K. Clapp, West Shokan, N.Y.—J. W. Cooke, 12 Trapelo Road, Waltham, Mass.—A. W. Drake, 768 Bourse, Philadelphia, Pa.—F. A. J. Fitzgerald, P.O. Box 29, Niagara Falls, N.Y.—P. L. Gilbert, Box 592, Andover, Mass.—J. H. Gregory, 506 American Savings Bank Building, Columbus, Ohio.—H. Kotzschmar, Jr., Room 142, Treasury Department, Washington, D.C.—J. C. Sherman, 1734 Beacon Street, Brookline, Mass.—R. K. Sheppard, Pennsylvania Building, Philadelphia, Pa.—R. N. Wheeler, 236 Main Street, Poughkeepsie, N.Y.—A. L. Simmons, Humane Hall, Albany, N.Y.—J. W. Cushing, 1577 Beacon Street, Brookline, Mass.—J. H. Gardiner, 1328 Candler Building, Atlanta, Ga.—W. T. Hall, 1025 Beacon Street, Brookline, Mass.—F. W. Harris, 71 Prospect Street, Little Falls, N.Y.—H. A. Holdrege, care Omaha Electric Light & Power Company, Omaha, Neb.—R. Morey, Chemical Building, St. Louis, Mo.—S. P. Hunt, 747 Union Street, Manchester, N.H.—C. W. Hayden, New England Telephone & Telegraph Company, 48 Oliver Street, Boston, Mass.—F. A. Bourne, 70 Kilby Street, Room 96, Boston, Mass.—E. P. Schoentgen, Council Bluffs, Ia.—S. S. Clark, 448 Security Bank Building, Minneapolis, Minn.—G. H. Matthes, 117 East Jefferson Street, Colorado Springs, Col.—R. H. Rich, Chief Engineer's Office, North Station, Boston, Mass.—C. F. Hatton, 358 Bunker Hill Street, Boston, Mass.—C. G. Badgley, P.O. Box 67, Seattle, Wash.—Miss K. A. Bowen, 63 Crescent Avenue, Buffalo, N.Y.—D. P. Hart, 3 West 29th Street, New York.—E. H. Clapp, 49 Federal Street, Boston, Mass.—G. G. King, 122 Munroe Street, Chicago, Ill.—Notice has been received of the death of Sanford Tappan at Manchester-by-the-Sea, Mass., on March 22, 1907.



1896.

E. S. MANSFIELD, *Sec.*, 39 Boylston Street, Boston, Mass.

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J. W. Stickney was married to Jessie William Crampton on Oct. 22, 1907, at Indianapolis, Ind. Their home address is 333 West 8th Street, Anderson, Ind. Stickney is district superintendent with the Central Union Telephone Company.—John Tilley, formerly with the New York Telephone Company, has associated himself with the Whitney-Steen Company, engineers, contractors, and builders, with main office at 135 Broadway, New York City.—Conrad H. Young, of the Armstrong Cork Company, spent seven months in France, England, Scotland, and Ireland, in the interests of the above company, returning home to Chicago about the middle of October, 1907.—Nathan H. Smith announces that he is now connected with the Tel-Electric Music Company, with headquarters at 405 Boylston Street, Boston. His residence is Bromley Court, Broadway and Prescott Street, Cambridge, Mass.—Reginald Norris, of the International Banking Corporation of San Francisco, Cal., has taken up his residence at 415 Montgomery Street, San Francisco.—John L. Matthews, formerly of the *Youth's Companion*, has gone West on a prospecting tour. He is interested in the subject of shipping on the Mississippi River.—H. C. Lythgoe has been promoted from assistant analyst to analyst of the State Board of Health of Massachusetts.—On Dec. 17, 1907, Marshall O. Leighton read a paper before the Boston Section of the American Institute of Electrical Engineers on "The Relation of Forest Cover to the Development of Water Power, especially in the Southern Appalachian Region."—We are giving below the latest addresses of the following men: M. A. Sears, Room 56, 45 Broadway, New York City.—F. A. Thanisch, Brownell, Ariz.—M. L. Fuller, 104 Belmont Avenue, Brockton, Mass.—R. S. Hardy, Hynes, Cal.—Henry Gardner, 210 Noble Avenue, Crafton, Pa.—A. J. Bowie, Jr., 827 Eddy Street, San Francisco, Cal.—C. A. Wentworth, 216 Bloomingdale Avenue, Wayne, Pa.



1897.

JOHN A. COLLINS, JR., *Sec.*, 67 Thorndike Street, Lawrence, Mass.

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Mr. and Mrs. Luzerne S. Cowles are receiving congratulations on the birth of their second son, Charles Hyde, born Aug. 30, 1907.—R. A. Swan, who is doing newspaper work in New Bedford, Mass., has been appointed one of the license commissioners by Mayor Ashley of that city.

1898.

PROF. C.-E. A. WINSLOW, *Sec.*, 157 Walnut Street, Brookline, Mass.

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The first informal reunion of the season was held at the Technology Club, Friday, November 29. Among those present were Goodrich, Blanchard, Russell, C. H. Smith, Godfrey, Kimball, Edgerley, Wright, Winslow, Johnson, Pease, H. T. Smith, A. H. Tucker, Learned, Milliken, Perry, Russ, Roberts, J. T. Robinson, and Major Bigelow. Dr. Dewey was the guest of the evening, and spoke of the growth of the Institute since 1898. The number of students has not changed very materially in ten years, but the funds of the school and the number of the instructing staff have greatly increased. The growing proportion of graduate students (now 1 in 7) and of students from outside the State of Massachusetts are notable features in the attendance. The establishment of new courses for graduate students leading to the M.S. degree was mentioned as an important addition to the curriculum. Dr. Dewey emphasized his belief, however, in the mission of the Institute as primarily an undergraduate school.—W. G. Smith is now with the Trussed Concrete Steel Company at 28 Congress Street, Detroit.—Seidensticker is in the chemical laboratory of the Arbuckle Brothers at the foot of Pearl Street, Brooklyn.—Godfrey has just been called to a position at the head of the Department of Science in the Girls' High School of Practical Arts, which opened this fall in Boston. Another of his "City" papers, "The City and its Milk Supply," was published in the August *Atlantic*.—Le Moyne is now at

Hagerman, Ida.—Strickland writes from Porto Rico: "Here is luck. A baby girl was born to me Nov. 13, 1907, in Bridgburg, Ontario, Canada, and named after my mother, Clara Turner Strickland."—Campbell is in Berlin at Kaiser Wilhelm Strasse, 49.—Wadsworth is located for a time in Boston on special work for the Metropolitan Improvement Commission. His address is 69 Westland Avenue.—Gardner is in the advertising department of *Collier's* at 416 West 13th Street, New York.—Jacoby writes to the secretary, under the heading of the American Dyewood Company, 84 William Street, New York:—

Am still with the above concern, and have a very congenial position, which is also gratifying from a financial point of view. Am living in a small Jersey town called Rutherford, on the celebrated Erie, the road that believes in safety (?) rather than speed.

Outside of business hours my time is taken up with the youngsters, of which there are two (boys) in the house, and with an Emerson-Angelus piano.

—Chace writes from Tucson, Ariz., as follows:—

I have been out in the "wild and woolly West" for about two years, and haven't been home for three years; but I hope to be back in Boston next summer to attend the celebration. Tech men are "scarce articles" in this section of the country, but I have working with me Crane, '07, and Thornton, '07, and I understand that Professor Goodrich, of the University of Arizona, is a Tech man, so Technology is fairly well represented in this town. My work here is in connection with the building of the Cananea, Yaqui River & Pacific Railroad in the Republic of Mexico, where we have had about 5,000 men and 2,000 teams at work on the construction of our new line, which will ultimately be about 1,200 miles long. I don't suppose you would have room for such a big line in the East; but out here we are not hampered by lack of room, for we can look off over the desert for nearly a hundred miles and see practically nothing to obstruct our view unless it be a range of mountains, perhaps 10,000 feet high. So, although I am a long way from Boston, I hope I may see you and the rest of the boys next summer.

—Just before the informal reunion Zimmermann wrote as follows from New Orleans:—

Maybe I don't wish I could be with you fellows on Friday night! It would certainly do my heart good to see you and Boston again. I got as far as New York on a business trip two weeks ago, but I couldn't get to Boston because of lack of time.

By the way, I organized the Tech men here at New Orleans into an organization last May,—or at least started the movement,—with the result that the Technology Club of the South was formed. We had a dinner on Decoration Day, and intend to have a second one to-morrow night. There are about twenty or so Tech men here at New Orleans and immediate vicinity, and we ought to have at least ten or twelve on hand to-morrow. Sears and myself are, I believe, the only '98 representatives. It is our intention, too, to get up a dinner before long of all the college men here at New Orleans; that is to say, co-operate with the Harvard, Yale, Princeton, etc., clubs with a view to having a joint dinner some time. Whether it will work or not will have to be seen.

I expect to give up New Orleans as my home in a week or two. The Bridge Company has just appointed me to take charge of the Atlanta office, and to handle this New Orleans district as well. My headquarters will be at Atlanta (Candler Building), and I will have some one here in this office reporting to me at Atlanta. So you see Atlanta will be my place of abode in the near future, but I'll probably have to come over here to New Orleans every now and then.

1899.

HERVEY J. SKINNER, Sec., 93 Broad Street, Boston, Mass.

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B. R. Rickards is managing editor of the *American Journal of Public Hygiene*, which is the official organ of the Massachusetts Association of Boards of Health and the American Public Health Association.—R. W. Stebbins has completed the construction work at the Malden-Melrose Gas Light Company, and has returned to Springfield, Mass.—J. H. Walton is professor of chemistry at the University of Wisconsin.—Etheredge Walker was in Boston the early part of October, and called on several of his friends. Walker's present address is Idanha Hotel, Boisé, Ida.—On November 12 a daughter, Harriet Parker Woollett, was welcomed into the home of Mr. and Mrs. John W. Woollett at Albany, N.Y.—E.

Sutermeister recently resigned his position as chemist for S. D. Warren & Co., paper manufacturers, located at Cumberland Mills, Me., and is now with the United States Bureau of Forestry, where he has charge of the experimental plant, formerly located at South Boston, and where a study is being made of the adaptability of various pulp woods to the sulphite process. His address is 1530 Pennsylvania Avenue, S.E., Washington, D.C.—Philip Stockton is president of the City Trust Company, 50 State Street, Boston.—T. W. Bailey is now located with Swift & Co., 34 North Market Street, Boston.—C. M. Swan has been elected vice-president of the Harvard Graduate Club. Swan has a year's leave of absence from the Institute, and is taking graduate work at Harvard.—H. M. Keys is with the Albany Home Telephone Company, Albany, N.Y.—W. E. Parker is with the United States Coast and Geodetic Survey, and is now stationed in the Philippine Islands at Manila.

1900.

H. E. OSGOOD, *Sec.*, 34 Pearl Street, Boston, Mass.

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In the retirement of Dick Wastcoat, whose duties as treasurer of the Ellis-Chalmers Company called him to New York City, where the company has opened offices, the class loses the services of an able and efficient secretary.—The last issue of the REVIEW went to press without news from 1900 on account of the inexperience of the new secretary in relation to the date of issue. However, we trust that it will not happen again. A strenuous kick, interposed with many blanks and dashes, was received from Chalmers on account of this neglect.—Several 1900 men were observed at the Yale-Harvard game at the Stadium. It was an ideal day, and those who were fortunate enough to be present enjoyed a good game.—A communication was received from John F. Wentworth, who states that his oldest child was born Sept. 3, 1902. "Can you beat it?"—A. B. White, Associate M.A.S.C.E., has with William F. Bixby formed the firm of Bixby & White, civil and hydraulic engineers, with offices in San Fernando Building, Los Angeles,

Cal., and are making a specialty of structural steel and reinforced concrete construction, irrigation and sewage systems.—N. J. Neall, after a year and a half of activity as a consulting electrical engineer at 12 Pearl Street, Boston, has formed a partnership with Percy H. Thomas, '93, under the name of Thomas & Neall, with offices in New York and Boston. Thomas has been associated for fourteen years with the Westinghouse Electric & Manufacturing Company, and, later, on special development work with the Cooper-Hewitt Electric Company. Readers of electrical literature are familiar with his contributions, which have been both frequent and important. The new partnership is a natural outcome of an association formed by Neall with Thomas shortly after Neall's graduation, which, save for a few years of separation due to a difference of interests, has continued ever since. Neall is delighted to be able to announce this arrangement, and looks forward with great anticipation of the future. Neall's interests have been varied and interesting, and have included important investigations in lightning phenomena and plant operation and advice on the electrical features of hydro-electric developments, among which is a large Southern proposition,—the Rockingham Power Company at Rockingham, N.C., which will ultimately generate some 24,000 horse power, and transit it at 60,000 volts in two parts on respective branches, approximately 100 miles in length.

1901.

R. L. WILLIAMS, *Sec.*, 30 Waban Hill Road, Chestnut Hill, Mass.

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As announced in the last REVIEW, Ralph H. Stearns has been called to New York, and I being assistant secretary, it now devolves on me to take up the work of secretary. I will try to devote as much of my time to the work as possible. In looking over our records, I find there are many of you fellows whom we have not heard from since graduation. What are you doing? Are you married? How many children have you? I wish you would take a few minutes and write to me. I am sure it would be interesting

to your classmates. I want to keep the class awake, but I can do so only with your support. Write now before you forget it.—It is with keen regret that I have to announce the death of one of our classmates, Lowell Bosworth Wilder, who was struck by lightning and instantly killed at Minersvale, Utah, October 17. Wilder graduated from the Newton High School in the class of 1896 and from the Institute in 1901. After his graduation he went immediately to Utah, taking a position as assistant superintendent at the mine of the Uintah Copper Summit Company near Vernal, Utah. In a few months he became acting superintendent, and later on manager of the mine, and remained there until 1905. During 1905 and 1906 he did a good deal of prospecting and exploring on the Green River in connection with the so-called Black Sands, and later he went to Salt Lake City and was for some time associated with the Newhouse interests. His stay at Minersvale was to be a temporary one, as he had a very responsible position that was to call him from there in a short time. On the afternoon of October 17 an electric discharge of great violence passed through the mining camp at Minersvale, stunning a number of men in the boiler-house, shocking severely one of the waitresses in the mining boarding-house, stopping the foreman's watch, and striking Wilder, who was standing in the door of the assay office, killing him instantly. He is survived by a mother, sister, and three brothers. He was a young man of most lovable nature, spotless character, and marked ability. Every prospect of a bright and even brilliant future seemed to be his. By his untimely death our class has lost one of its best men.—The secretary ran across Archibald H. Wilson a short time ago. He has a responsible position with the Stone & Webster Engineering Corporation.—William J. Sweetser has given up his position as professor at the Mount Allison University, and is now located in Boston.—Henry R. Gilson has recently returned to Boston from the Great Lakes, where he has had charge of the equipment of some of the large lake boats with submarine signal apparatus. He is favorably impressed with the West, and thinks there are great opportunities there for Tech men.—I find there are sixty-seven of our class living in or near Boston. With such a number as this



more should show up at our class dinners. They are not the stiff, formal affairs some of you may think who have never attended. Try the next one, and you will want to come again.—The following changes in address have been received: Norman L. Skene, Bedford, Mass.—R. B. Morton, 29 Fairfield Street, Montclair, N.J.—W. W. Dow, 147 Milk Street, Boston, Mass.—F. B. Driscoll, 15 Dey Street, New York City, N.Y.—F. D. Chase, 1 Park Row, Chicago, Ill.—J. P. Catlin, 48 Mall Street, West Lynn, Mass.—F. R. C. Boyd, 40 Ocean Avenue, Lynn, Mass.—W. G. Blauvelt, 15 Dey Street, New York, N.Y.—W. I. Bickford, Frick Building Annex, Pittsburg, Pa.—William C. Arsem, Research Laboratory, General Electric Company, Schenectady, N.Y.—E. H. Callahan, 164 Main Street, Salt Lake City, Utah.—J. T. Scully, 53 Royal Street, Allston, Mass.—J. A. Trott, 1 Lincoln Hall, Trinity Court, Boston, Mass.—C. L. B. Anderson, 1622 Candler Building, Atlanta, Ga.—Miss G. MacLeod, Technical High School, Springfield, Mass.—Rev. George A. Hall, McHenry, No. Dak.—C. R. Hammond, 136 Liberty Street, New York, N.Y.—A. W. Higgins, 1100 Times Building, St. Louis, Mo.—W. G. Kelley, 139 Adams Street, Chicago, Ill.—Preston Player, 15 State Street, Boston, Mass.—G. L. Mitchell, 15 South 5th Street, Minneapolis, Minn.—L. A. Miller, 360 Broad Street Station, Philadelphia, Pa.—C. F. Willard, 1340 Girard Street, Washington, D.C.—R. Whitman, United States Navy Yard, League Island, Pa.—R. W. Wight, 148 Henry Street, Brooklyn, N.Y.—F. W. Smith, Big Four Building, Cincinnati, Ohio.—W. A. Read, 1496 Bedford Avenue, Brooklyn, N.Y.—Professor W. M. Curtis, College Street, Orono, Me.—L. du Pont, P.O. Box 303, Wilmington, Del.—G. P. Shute, 85 No. High Street, Columbus, Ohio.—E. P. Beckwith, Garrison, N.Y.—A. K. Isham, 1609 14th Avenue, N.W., Seattle, Wash.—F. W. Coburn, Box 114, Duquesne, Pa.—T. F. Lange, 233 Warburton Avenue, Yonkers, N.Y.—R. E. Dow, Melrose, Mass.—J. C. Woodsume, Houghton, Mich.—H. P. MacDonald, foot of Pine Street, Jersey City, N.J.—E. J. Proulx, 112 North Broad Street, Philadelphia, Pa.—H. C. Morris, Box 214, Goldfield, Nev.—H. T. Blanchard, 4 East 39th Street, New York, N.Y.—Charles I. Auer, Estacion Pedri-



ceña, Durango, Mex.—Professor F. H. Sexton, Nova Scotia Technical College, Halifax, N.S.—J. E. Philbrick, 46 Centre Street, Brockton, Mass.—A. W. Peters, 15 Landseer Street, West Roxbury, Mass.—C. P. Rockwood, 1220 North Alabama Street, Indianapolis, Ind.—O. H. Perry, Jr., 93 Federal Street, Boston, Mass.—L. E. Crouch, 164 High Street, Boston, Mass.—Miss A. M. Courtney, 144 Keap Street, Brooklyn, N.Y.—F. F. Dorsey, 39 Cortlandt Street, New York, N.Y.—V. E. Lacy, 900 Water Street, Toledo, Ohio.—A. A. McInnes, 95 Sawyer Avenue, Dorchester, Mass.—J. L. Parke, 605 South Thayer Street, Ann Arbor, Mich.—W. S. Pepperell, Gillon Block, Milford, Mass.—J. M. Hood, Jr., 1008 Continental Trust Building, Baltimore, Md.—F. H. Pough, 149 Columbia Heights, Brooklyn, N.Y.—F. K. Baxter, Mina, Nev.—F. J. Dulude, 375 Jefferson Avenue, Brooklyn, N.Y.—William J. Sweetser, 60 State Street, Boston, Mass.—R. E. Bruce, 688 Boylston Street, Boston, Mass.—Miss M. P. Anderson, 435 West 123d Street, New York, N.Y.—Charles T. Lincoln, foot Pearl Street, Brooklyn, N.Y.—H. W. Chambers, 550 Park Avenue, New York, N.Y.—C. M. Culp, 428 Pioneer Building, Seattle, Wash.—R. M. Derby, 111 Broadway, New York, N.Y.—Dr. N. A. Dubois, Case School of Applied Science, Cleveland, Ohio.—G. F. Fisk, Room 13, City Hall, Buffalo, N.Y.—G. L. Harris, 196 Main Street, Easthampton, Mass.

1902.

F. H. HUNTER, *Sec.*, 75 Park Street, West Roxbury, Mass.

Owing to the early appearance of the Class Record Book, the notes for this number of the REVIEW have been reduced to an account of recent gatherings. Such individual matters as engagements, marriages, and babies, are all duly set forth in the book, which should follow quite soon after this number reaches its readers. On Friday, the 15th of November, there was an informal gathering of '02 at the Tech Union. Twenty-eight men sat down to dinner, which makes it the largest meeting, except the June reunion for

some years. After the edibles were successfully concealed in our midst, the president and secretary made some of their usual innocuous remarks, and then Hooker was turned loose on the "Stein Song." A vaudeville artist furnished some enjoyable sketches; but, with Haworth at the piano, Nick at the punch ladle, and Hooker on his feet, the class had quite a team of its own. The evening was passed with song and fun. Those on hand were Ames, Ballard, Boardman, Collier, Fisher, Fitch, "Steve" Gardner, George, Haworth, Hooker, Hunter, Magrane, Mahar, Mitchell, Moore, Nickerson, O'Neill, Patch, Adrian Sawyer, Sears, Shedd, Stillings, Walker, Wemyss, Wetherbee, R. F. Whitney, Whittet, and "Doc." Williams.—On the 16th of the same month, at a gathering of the Northwestern Association, a good turn-out of the '02 men in Chicago took place. "Pete" Currey, Hervey, Jackson, Lockett, Nash, Wesson, and L. E. Williams were noted. Such a good showing promises well for a strictly class gathering later on. Later in the season there will be meetings in both New York and Chicago, and again in Boston.

1903.

WALTER H. ADAMS, *Sec.*, Polytechnic Institute, Brooklyn, N.Y.

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The new constitution has been sent out to all members of the class who are in good standing. After the election of the new officers in January, copies of the constitution will be sent to all persons who have ever been members of the undergraduate organization. Under the revised constitution it is hoped that more interest will be aroused and '03 will wake up.

There was an informal class dinner in Boston on December 7, but the secretary has received no report and so cannot give any further information.

The following changes of address have been received: Williams has returned from Ecuador, and may be addressed at 89 Federal Street, Salem, Mass.—Macdonald is now with the Union Metallic Cartridge Company at Bridgeport, Conn.—Lyons has returned to New York, and his address is 138 Liberty Street, New York, care

of Otto Gas Engine Works.—Foster is now with the Union Light, Heat & Power Company at Covington, Ky.—Eaton's address is 151 Warren Street, Newton Centre, Mass.—Endres is with the American Telephone & Telegraph Company at 15 Dey Street, New York.

1904.

R. A. WENTWORTH, *Sec.*, Saylesville, R.I.

M. L. EMERSON, *Res. Sec.*, 161 Devonshire Street, Boston, Mass.

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As may be seen by the heading, Wentworth was the result of the recent class election. I have donated to Emerson the duty of gathering all '04 news that reaches Boston. Please keep him busy. At the time of writing we have held office about two weeks. Our items of interest are therefore few, and some of them are almost decrepit.—Lang's health is much improved since the secretary's responsibilities have fallen from his shoulders. He is still working on the new Michigan Central Railroad tunnel under the Detroit River from Detroit to Windsor, Canada. It is a concrete two-track tunnel. Lang is division engineer, and has charge of 2,800 feet of approach tunnel on the Canadian side. He bought a pair of rubber boots in Detroit, but had to pay duty on them before they could be worn in Canada.—Frank Davis also is in Detroit with the Detroit Carbuilding & Equipment Company, working for his brother (a Tech man), who is manager of that concern.—A. P. Weymouth was married Oct. 30, 1907, at Hudson, Ohio, to Miss Ida May Myers.—Last June Willard hung out his shingle in Washington as consulting mechanical engineer. He has had some good contracts, including the design and erection of several government buildings. The best contract of all was made November 26, when he was married, the bride being Miss Sarah Lamborn.—Pete Boggs was in poor health last spring as result of fever caused by his stay in Mexico, and was at home for some time.—Schaefer is in partnership with another Tech man in Buffalo in the leather goods business. They have added recently a side line in pottery.—Lee Phillips was married out West, but is now back in Boston with

French and Hubbard.—Chandler is still connected with the Boston office of the Factory Mutual Fire Insurance Company. At last reports he was on a trip through Connecticut and South-western Massachusetts, inspecting belt-ways, on which the insurance requirements are to be, or just have been, changed.—After taking a Ph.D. at Zürich and studying at the Cavendish Laboratories, Cambridge, England, Comstock is now back at the Institute teaching physics.—Tammie Rockwood and Murray (who was with us for about a year) are with the Eastern Expanded Metal Company in Boston. Tammie spent the summer at Provincetown, supervising the expanded metal reinforcement work on a new concrete building.—Haraden is still with the General Electric Company at Lynn. He was married in June, and is living at 111 New Park Street, Lynn.—The last Sunday I was in Boston I tried to locate Cy Ferris. It was cold and snowy, but Cy was preparing for next summer, as he was off somewhere, scraping his boat. He is in Stone & Webster's insurance department. It is not true that he has lost weight.—Mert Emerson vacillates between the pneumatic department of the Lamson Consolidated Store Service Company and the mail tube service of the American Pneumatic Service Company,—two closely allied corporations. His work has taken him recently to Chicago twice, also to St. Louis and New York.—H. W. Stevens is superintendent of overhead construction for the Boston Edison Company.—Charlie Homer was married last June. Within a month he was sent to San Francisco by Stone & Webster, and has been there ever since. He expected to get home for Christmas.—R. B. Sosman, who for some time has been chemist on the staff of A. D. Little in Boston, won last June the degree of Doctor of Philosophy from the Institute.—On March first '04 received a new member in the person of Mary Jane, daughter of E. J. Wilson. The secretary vouches for her as a credit to the class.—You may remember that Charlie Barrett wouldn't take a girl to our Prom. for fear that she would think that she was "it." He is now Married. How we do change!—Holcombe and W. J. Gill, Jr., recently took Patent Office exams., and struck high C. They are now assistant examiners at Washington. I thought that Holcombe was wedded

to automobile work, but he may be headed towards automobile patent law.—Joe Crowell was married last October, and it is reported that Rapier and Harry Rollins are married, but further details are missing.—Ralph Ingram was at one of the American Woollen Company's mills in Providence, where I used to meet him and Mrs. Ingram occasionally on a Saturday afternoon. He is now superintendent of the Prospect Mill at Lawrence.—Fred Pierce is engaged to Miss C. Louise Turner, of Brockton, Mass. They will be married on Jan. 1, 1908, and will live on College Hill, Beaver Falls, Pa., where Pierce is located with the Pennsylvania Bridge Company.—H. H. Groves is with the Boston & Albany Railroad.—Alfred Peabody is treasurer of the Stirling Manufacturing Company of Salem, Mass. This company makes rubber substitutes and insulating material.—Kalmus and Willard were shaken out of their private school in San Francisco by the earthquake. Kalmus is now at the Institute. He says that, when he and Comstock were at Zürich together, working for their Doctor's degree, they had a marked advantage over the other men there, due to the superior preparation of the Massachusetts Institute of Technology. How's that for a direct comparison with other schools?

1905.

GROSVENOR D'W. MARCY, *Sec.*, 246 Summer Street, Boston, Mass.

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The following fellows were in Boston during the holidays: Joe Daniels, B. L. Johnson, J. T. Glidden, Alden Merrill, Louis Robbe, and V. H. Paquet. The Boston '05 club dinners continue to be held at the Technology Club on the second Tuesday of each month. '05 men coming home, remember the date, or call up Marcy, Main 1837, on the 'phone.—Chester H. Butman has left the General Electric Company, having finished the "course" there, and is now an assistant in the Physics Department at Tufts College.—G. F. Parsons, who has been in Boston during the fall, has been assigned by the Stone & Webster Company to the Woonsocket Electric Machine and Power Company, Woonsocket, R.I.—Thomas McC.



Gunn has left the University of Maine, where he has been an assistant, and is now at Fore River, doing estimating work.—T. H. Files is with the Pennsylvania Tunnel & Terminal Company, at 345 East 33d Street, New York City.—It is reported that J. E. Barlow and W. C. Pickersgill have had a substantial advance in their rating as assistant engineers with the New York Board of Water Supply.—W. S. Richmond is a junior engineer on the Great Lakes Survey, and has been located at Niagara Falls since last summer.—Charlie Clapp has come back to his first love, and is now with the Geological Department at the Institute.—The notice of the engagement of George C. Thomas to Miss Marie Honer, of Bridgeport, Conn., was received just too late to appear in the last REVIEW. Thomas is at the Bridgeport plant of the Singer Manufacturing Company, and has charge of the generation of heat, light, and power. Since leaving the Institute, he has visited several of the other Singer plants, to study conditions and make comparative reports. He says his engagement is scheduled to end in the spring or early summer. May it be the right end, Tommy! —Charles W. Hawkes left the New England Telephone & Telegraph Company last fall, to take a position with the American Machine Tool Company at Pawtucket, R.I. Charlie's friends wondered that he made the trip from Dorchester to Pawtucket every day, but the reason became clear after Christmas, when his engagement to Miss Pancha L. Clark, of Dorchester, was announced.—Arthur H. Howland was married to Miss Anna Rossetter Smith, of Chicopee, Mass., on September 25. Howland is supervising architect with the National Concrete Company. His address is 1113 Central Avenue, Indianapolis, Ind.—Miss Mary Newell Healey was married to Francis J. Chesterman on October 2 at Hampton Falls, N.H. They are now at home at 8 Inwood Place, Upper Montclair, N.J.—Edward A. Burkhardt was married on October 15 to Miss Corinne Prescott Wilde, of Quincy, Mass.—Miss Jennie Abigail Kingston, of Malden, was married to Robert W. McLean on November 20. Bob is with the Carver Cotton Gin Company.—William H. Beers and Miss Tallulah Elizabeth Mulliken, of Columbia, S.C., were married on



December 21. This makes about the record quarter for weddings.—E. L. Hill reports the birth of an eight-pound boy on October 9. At the time of writing he was adding 8 to 10 ounces to his avoirdupois weekly, which gave a weight curve highly satisfactory to his "dad." Hill is assistant district engineer at the Worcester works of the American Steel & Wire Company.—The number of junior members of the class of 1905 is increasing rapidly. The secretary moves that at the time of the big reunion, in 1909, when everybody will be back from the ends of the earth, we have a baby-carriage parade. This would give every one a chance to see Miss Constance Whitney, who brought much joy to Mr. and Mrs. H. L. Whitney, of Beverly, on November 21.—Bob Lord has at last broken the silence which has been coming from Gorham, Me. Bob is superintendent of the Ireson Tanning Company of that place, and has been bringing out a new brand of chrome belting, which for water-resisting, non-stretching, tensile, and other properties seems to have everything else skinned to death.—R. N. Turner has entered the political arena, and after an enthusiastic campaign by his friends and neighbors was elected to the Waltham Board of Aldermen by the biggest majority ever given a Republican candidate in his district.—A. J. Manson writes that he and L. C. Winship are with the Westinghouse Electric and Manufacturing Company, in the railway construction department, and are at work on the New York, New Haven & Hartford electric installation in connection with the electric locomotives. He adds that E. M. Lines is in the New York sales office, and C. W. Babcock is in the Boston office of the same company. Manson quotes from a letter from C. E. Atwood, who is in Chile, as follows: "Things are going along swimmingly here. Have put in one electric light plant, and have two more partly done, and another waiting as soon as I have completed these two. Keeps me on the hump all the time, but I'm living on the fat of the land and having the time of my life. You poor devils way back in the States don't know what you are missing." Since getting this letter from Manson, the secretary noticed the following item in the paper: "The engagement is announced of Miss Marion K. Vinal, the daughter of Mr.

and Mrs. Harry A. Vinal, of Dorchester, to Mr. Arthur J. Manson, of New York, Technology, '05."—The secretary received a letter from Seedy Klahr from Louisville, Col., where Westinghouse, Church, Kerr & Co. are building a 6,000 K.W. power house. He says: "It was a matter of \$20,000 to the owners to have this equipment ready the 1st of December; but, owing to delays in shipment, some of our material did not reach us until after the middle of November. We worked day and night gangs, and finally had both turbines going Thanksgiving evening, with only two days to spare,—a closer shave than I ever want to have again." Speaking of the country, he says: "The climate is all right, but the people are not planted close enough together to suit me. I am for the crowded cities and race suicide. You know the sun shines three hundred and eighty-nine days a year in Colorado; but, when the 'boosters' brag about their climate, they don't say anything about the wind. When we were erecting the brickwork here, the wind blew so hard that loose bricks were blown off the top of the walls."—George Jones writes, "Aside from the fact that the President was seen recently putting a fresh coat of paint on the White House, there is no news or scandal of any kind from Washington."—L. T. Bushnell writes from Seattle, Wash., where he is doing the "engineering, or near-engineering," for the Mill Owners' Sprinkler Company, and finds plenty to do in spite of the general slackening in business activity.—The secretary hears from Bill Spalding now and then, and recently suggested to him that, if he wasn't careful, he would forget and write something that could be used in the REVIEW, whereat Bill replied, "How is this?—

## SOCIAL ITEMS FROM BINGVILLE

Mr. Cowper is reported to be the town fusser of Lewiston, Pa.

The selectmen of Bingville are to hold a special meeting to see what can be done to stop the alarming and dangerous spread of the barn dance in our city.

Mr. J. T. Glidden has recently sailed for the Cerro de Pasco Mining Company of Peru, S.A. New York life, where nobody drinks but father, is too slow for John, and his thirst has driven him to the home of Peruna.

Mr. William Gouinlock has become a model citizen of Warsaw, N.Y., and is setting a bright and shining example to the youth of that city. He and Cowper have agreed on a \$50 fine for smoking within one year, and the Tobacco Trust is staring ruin in the face.

C. A. Houck, as a side issue, has become a travelling exhibitor of Sambo, the famous clog-dancing doll, which entertains the young and old alike. He may be booked for an evening's performance at a reasonable rate, and is sure to make a hit.

Rumor hath it that Spalding is drawing a salary of \$5,000. We feel called upon to nip this in the bud, lest our creditors hear of it; but we cherish the wish that the Big Noise would begin the New Year by making the necessary change in the decimal point."

Very good, Bill. Let's hear from the other rural districts.

1906.

THOMAS L. HINCKLEY, *Sec.*, 745 Osceola Avenue, St. Paul, Minn.

ANGELO T. HEYWOOD, *Res. Sec.*, Mass. Inst. of Tech., Boston.

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The class has long been waiting for the reports of the reunion and the ballots, and many inquiries have come in regarding them. The resident secretary, who has charge of this, feels that it is necessary to make some explanation for this delay. He writes as follows:—

Anticipating a very busy summer and autumn in personal matters, I had made plans to have the class material printed and all mailed during the summer, but while I was away from Boston, working in the mining district of Cobalt, Ont., during July, August, and September, the material was in some manner side-tracked, and, much to my regret, was not printed. When I returned from Canada, I was immediately engaged in removing from Boston to Wakefield, and thereafter in work in the Mining Department of the Institute. Lame as it may seem, I must confess that I feel that I have been very busy, but this, of course, is no excuse, when it comes to "doing things." Daily travelling back and forth on the railroad has effectively and fatally consumed the time usually available for secretarial work, and it is only during the recent Christmas vacation that I have been

able to get my part of the class files and material into order to work with. This is now done, and I have some hopes this month of raising my embargo on the class mailing department and of helping to put the constitution in operation as rapidly as possible.

It is expected that arrangements will soon be under way for the midwinter class dinner to be held in the early part of February. The call for this dinner will be sent with blanks for information, present addresses and dues, and will probably reach the members before this number of the REVIEW is received.

The secretaries take pleasure in recording the following happy events:—

“Mrs. Alma Johonnot announces the marriage of her daughter Christina Vaughn to Mr. Ralph Reginald Patch on Wednesday, September the fourth, nineteen hundred and seven, Stoneham, Massachusetts.”

“Mr. and Mrs. Frank Weston Chandler request the honor of your presence at the marriage of their daughter Charlotte Estelle to Mr. Arthur Edward Wells, on the evening of Thursday, the fifteenth of August, one thousand nine hundred and seven, at seven o'clock, 52 Harpswell Street, Brunswick, Maine.”

“Mr. Albert Taft Aldrich announces the marriage of his daughter Sadie May to Mr. Andrew Bartlett Sherman, Jr., on Tuesday, December thirty-first, nineteen hundred and seven, Fitchburg, Massachusetts.” (By wireless.) It is reported that Sherman has accepted a position of teaching in Virginia.

Mr. Herbert J. Ball (II.) was married on July 30 at Allston, Mass., to Miss Fannie J. Babcock, of Bay Roberts, Newfoundland. Mr. and Mrs. Ball made a wedding trip to Bay Roberts, and are now at home and keeping house at 15 Woodward Avenue, Lowell, Mass.

Again, by wireless, we have that Russell Peter Raynolds (III.) is to be married. “Pete” is in Colorado, and we hope he will transmit details of the glad news.

Charles Allen Merriam (II.) was married Oct. 2, 1907. He is with the Simplex Electric Company, Cambridge, Mass.

Clarence E. Lasher was married on Nov. 5, 1907, to Miss Sarah Maud Henderson at St. John's Church, North Adams, Mass.

During the past summer Sylvanus W. Wilder came home on a visit to Boston from Paterson, N.J.—We observe that H. S. Philbrick is now a professor in the University of Missouri, Columbia, Mo.—Cliff Wilfley (III.) writes of an interesting journey to Mexico.—Hunter Light is reported doing well in Pennsylvania.—Several of the fellows dropped in at Christmas time to see old Tech, and the following “spoke” the resident secretary: C. A. Farwell, Marden W. Hayward, W. A. Sheldon, James H. Polhemus, George M. Henderson, George F. Hobson, Richard V. McKay.—In October James R. O'Hara, Jr., dropped in on his way to Tennessee.—Anna M. Cederholm is teaching in Wellesley College.—Harold C. Elliott (I.) is engaged near Boston in experimental work on a portable acetylene gas generator and storage tank.—It is reported that Roland P. Davis (I.) won a valuable scholarship in civil engineering research at Cornell University, Ithaca, where he is now engaged.—We have a new address for “Tommy” Holmes.—W. A. Sheldon has returned from Houghton, Me.—Mildred E. Blodgett is teaching in the St. John Baptist School, New York City.

1907.

ALEXANDER MACOMBER, *Sec.*, 83 Newbury Street, Boston, Mass.

### I. *On the Part of the Secretary*

It is gratifying to note that a good percentage of the class is responding loyally to the secretary's call, about 60 per cent. of the graduating class having answered the circular letter, besides a number of men connected with '07 in earlier years. Since only about a dozen letters have been returned unclaimed, it is hoped that in time we shall hear from the others. Now that the fellows have become more or less settled, all are urged to look up any classmates in their vicinity and form local organizations, getting together once in a while to renew old times and keep up the loyalty to our college. The secretary will be glad to communicate with



any one desirous of carrying this out, and will furnish addresses of those who are so situated that they can join in. Men of other courses may be interested to follow the example of Course VI. in starting a circular letter, each man adding his contribution and sending it along. The next event of general interest will be the first class reunion at Commencement. Plans are already under way to make this a great occasion, and every man had better begin to save up his railroad fare to Boston. Full details will be sent out later, and will also appear in the April REVIEW. The following letter was received from the Technology Club of New York:—

THE TECHNOLOGY CLUB OF NEW YORK,  
36 East 28th Street.

Secretary Class of 1907:

*Dear Sir,*—Will you kindly send me a list of the '07 men in or near New York City? We gave a smoker to '07 last month, but had few responses. We are to give a series of smokers and addresses by scientific men this winter, beginning October 26, and want '07 men to enjoy them with us.

Sincerely,

WILLIAM H. KING, *Secretary.*

This request was complied with, and every man who is passing through New York is urged to visit the club, where, as your secretary can personally vouch, he is assured of a hearty welcome.

## II. *Personal Notes*

Under this heading appear such notes, changes of address, and new addresses as have been received since the last REVIEW. It will be necessary to refer to previous REVIEWS for such addresses as have already been printed and have not been changed. At the beginning of each year a complete list of the class will be published as far as the records permit.—F. O. Adams, Jr., is with Newhall & Blevins, architects, 9 Park Street, Boston.—F. W. Amadon's address is 63 Union Avenue, South Framingham, Mass.—E. W. Bonta has been ill since graduation and is undergoing treatment at a New York sanatorium. His home address is "The Snowdon," James Street, Syracuse, N.Y.—L. W. Brock's address



is 496 Cambridge Street, Allston. Lester is another to become inoculated with the class germ, as an extract from his letter in the next section shows.—George Bryant is now on the dramatic staff of the Boston *Transcript*. Address, 103 President Road, Braintree, Mass. George is another one of these Benedicks.—K. G. Chipman is back at Tech this fall. His address is 97 Hillside Avenue, West Newton, Mass.—W. B. Coffin is with R. C. Sturgis, architect, 120 Boylston Street, Boston.—John A. Davis is with the United States Geological Survey, Washington, D.C.—Carrol Deane's address is 392½ Washington Avenue, Scranton, Pa. Carrol has evidently changed his mind in regard to the Westinghouse apprentice course, as Tresnon, '07, reports he is not there.—H. S. Duncan is at Globe, Ariz., with the Old Dominion Copper Mining & Smelting Company.—M. H. Eisenhart is with the Eastman Kodak Company, his address being 2 Magee Avenue, Rochester, N.Y.—Charles Everett is studying in France. Address, 5 Rue Palatine, Paris.—Otis G. Fales is with the Gregg Company, Limited, of Newburg, N.Y.; address, 44 Carson Avenue, Newburg, N.Y.—John Frank has not been heard from. Is he still looking for that job? John's home address is 310 North Pearl Street, Natchez, Miss.—J. M. Gaylord is in the office of the Chief Engineer United States Reclamation Service. His address is 146 Terrace Drive, Pasadena, Cal.—L. F. Hallet comes back to Tech this fall.—E. W. Hamill expects to be located in St. Louis. His present address is Belleville, Ill.—F. E. Hamilton (ex '07) is with the Allis Chalmers Company. Address, 471 Marshall Street, Milwaukee, Wis.—L. C. Hampton's address is 10 St. James Avenue, Boston.—J. W. G. Hanford is with Herbert Smith, M.E., Jameson Building, Spokane, Wash.—Warren Hastings is with the New Jersey Zinc Company, Franklin Furnace, N.J.—A. W. Hull is with the Newport News Shipbuilding and Dry Dock Company. Address, 125 33d Street, Newport News, Va.—J. F. Johnston, Jr., has changed his address to 3075 California Street, San Francisco, Cal.—G. R. Jones is with the Washington Filtration Plant, Washington, D.C.—Warren Keeler is with the Carpenter Steel Company. His address is 406 Green Terrace, Reading, Pa.—John Kimball is with the Penn-

sylvania Railroad, Room 1113, Union Station, Pittsburg, Pa.—W. F. Kimball is with the Malden Electric Company, 101 Linden Street, Malden, Mass.—R. F. Knight, is with the Henry Souther Engineering Company, 440 Capital Avenue, Hartford, Conn.—A. T. Kolatschevsky is back at Tech.—E. F. Lewis is with Allen & Collins, architects, 6 Beacon Street, Boston.—M. E. MacGregor's address is 189 Fairmont Avenue, Hyde Park. Mac is not settled yet, having just returned from a Western trip.—Macomber, who after graduation was in the Boston office of Stone & Webster, is now on a business trip in California. His address as class secretary still remains 83 Newbury Street, Boston.—N. A. Middleton is with the American Locomotive Works, Richmond, Va. Address, "The Winona," Baltimore, Md.—Addison Miller is doing graduate work in electricity at Cornell. Address, 803 Lincoln Avenue, St. Paul, Minn.—W. D. Milne is back at Tech this fall. Address, 224 Newbury Street, Boston.—J. G. Moore is with the American Bridge Company. His address is Savona, Del.—J. E. Moore is with P. N. Nunn, engineer, of Provo, Ida. His present address is Alexander, Ida.—Pastoriza is working for the same concern with Moore.—E. P. Noyes (ex '07) is with the Turner Construction Company of 11 Broadway, N.Y. His present address is Springfield, Mass., care of that concern.—G. W. Otis (ex '07) is with the American Blue Stone Company of Warsaw, N.Y.—E. H. Reed, Jr., is unsettled at present, his home address being 4758 Lake Avenue, Chicago.—Don Robbins has left Horton & Heminway of Boston, and is with W. H. McElwain & Co., shoe manufacturers, Box 322, Epping, N.H.—W. D. Robinson is with the Newport News Shipbuilding & Dry Dock Company. Address, Box 23, Newport News, Va.—T. W. Roby, Jr., is with the McClintie-Marshall Construction Company. Address, 408 Whitney Avenue, Wilkesbarre, Pa.—V. S. Rood is with the Daly West Mining Company, Park City, Utah.—L. P. Russell is with the Central Colorado Power Company. Address, 5th and Lester Streets, Leadville, Col.—Tracy Smith is in the testing department of the General Electric Company. Address, 618 Chapel Street, Schenectady, N.Y.—A. F. Stevenson is assistant at the M. I. T. Sewage Experiment Station.—C. F. Story

is with the water department of the city of Springfield, Mass. Address, 43 Bridge Street, Springfield.—John Tetlow (ex '07) is with the Builders' Iron Foundry, Providence, R.I. Address, 111 Friend Street, Adams, Mass.—C. J. Trauerman (ex '07) is with the Enterprise Mining Company, Cooney, N.M.—J. E. Tresnon is taking the apprentice course with the Westinghouse Company. Address, 427 Hawkins Avenue, Braddock, Pa.—E. E. Turkington is with J. G. White & Co., 43 Exchange Place, New York City.—Lawrence Wetmore is at Foxboro, Mass., with the Shaeffer & Budenberg Manufacturing Company.—A. E. Wiggin is with the Boston & Montana Consolidated Copper & Silver Mining Company at Great Falls, Mont.—E. S. Wires is with James Purdon, architect, 8 Beacon Street, Boston.—The secretary would like the addresses of the following: Eugene Phelps (IV.), H. J. C. MacDonald (III.), B. C. Gupta (VI.).

### III. *Letters*

Nate Middleton writes:—

"I went abroad this last summer and luxuriated in Paris and London before starting to work in this beastly hole (American Locomotive Company at Richmond, Va.). The powers that be have decreed a year in the shops, so in the shops am I. Immediately on landing in New York I went to Schenectady to report, and from there was sent here.

—From H. G. Pastoriza:—

Ernest Moore and I are in the employ of Mr. P. N. Nunn, who is building a 40,000 H.P. hydro-electric plant here in the wilds of Idaho. We are in the midst of a country of sand and sage brush and Mormons, where they raise wheat and alfalfa and ask a blessing at the beginning of a dance. Besides Ernest and myself, J. C. Damon, '05, is here. Several weeks ago we three Tech men climbed a snowy peak across the river, and at the summit, about 10,000 feet above the sea, we built a big stone T, about fifteen feet high, to commemorate our visit and perhaps persuade some of the rising generation of Idaho to come to Tech.

—The following was clipped from the Boston *Transcript*:—

“The new courses in mechanical drawing, descriptive geometry, and surveying at Bowdoin have proved very popular. The courses were established so that men who are going to follow up the sciences may have the advantages of four years of liberal arts as a foundation for higher technical training. These courses also enable men to complete their studies in any of the leading technical schools of the country in two years. The instructor, Henry B. Hastings, is a graduate of Phillips Exeter Academy and of the Massachusetts Institute of Technology, and received the degree of civil engineer last June.”

—R. F. Knight writes:—

I have been down here at Hartford, Conn., since June, and have charge of the testing laboratory of the Mechanical Branch of the Association of Licensed Automobile Manufacturers. We are fitted up to make tests on automobile motors, carburetters, and other appliances.

—George Bryant writes:—

Put me down as married—and glad of it—to a girl who thinks Tech is the only place worth while. I advise all who can to enter the field of matrimony.

The electrical engineers will particularly enjoy the following note from Lester Brock:—

Yes, the 1907 bug caught me the fifteenth day of June, and I came into the magnetic field surrounding a certain Bertha Helen Muzzey, of Tilton, N.H. Our polarities happened to be just right, our frequencies soon got into step and we synchronized. We expect to throw in the external circuit in about three years, unless we get to “hunting” and “go out.” I tell you, Mac, we came in without so much as a grunt: the belt didn’t even jump. When we get the power on, you must come and see us.

The fellows are urged to keep up the good work of writing to the secretary, for extracts from these letters make the notes much more interesting. So do your share, and let us hear from each man. Only don’t be offended if the secretary does not answer your letter immediately, for his correspondence is growing to such an alarming extent that he already has a good case of “writer’s cramp.”

## NECROLOGY

EDWARD A. HANDY, '75

From the *Cleveland Plain Dealer*, Nov. 22, 1907:—

Edward A. Handy, general manager of the Lake Shore & Michigan Southern and allied railroads, died yesterday at 1.30 P.M. at Chicago. His death was a shock even to those about him, for his illness dated back but a few days. Pneumonia is assigned as the cause of his death.

The active career of General Manager Handy was unique in the railroad history of the United States. Entering the railroad service as a civil engineer, following that profession on various great lines throughout the country and into Mexico, he remained essentially an engineer through all the grades of promotion until he became general manager of the Lake Shore & Michigan Southern and its lines. Then for the first time he became identified with the operating department of railroad service.

Mr. Handy was born April 4, 1855, at Barnstable, Mass. He was graduated from the Massachusetts Institute of Technology in 1875 as a civil engineer. As assistant engineer of construction, he entered the service of the Atchison, Topeka & Santa Fé Railroad in May, 1878. The following year he was appointed assistant engineer of bridges and buildings for the same road, continuing in this position until May, 1880. In July of that year he was employed by the Mexican National Railroad as locating engineer, holding the position until January, 1881, when he became principal assistant engineer of the northern division of the Mexican National. From March, 1883, to September, 1888, he was chief engineer of the same road.

While Joseph O. Osgood was chief engineer of the Lake Shore, with headquarters in Cleveland, he learned of the brilliant young engineer in the South-west, and determined to bring him to this city. In March, 1888, Handy entered the service of the Lake Shore. He was first appointed civil engineer of the Lake Shore Eastern Division, as it was then known, being that portion of the system extending from Buffalo to Toledo. Mr. Osgood afterward went to the New Jersey Central, where he has since remained. Mr. Handy was then named chief engineer of the Lake Shore & Michigan Southern in July, 1891. His duties as chief engineer of the big system were considerably added to in February, 1900, when he was also



named chief engineer of the Lake Erie & Western, which line had been acquired by the Lake Shore.

The office of assistant manager of these lines had been in abeyance for several years, but July 15, 1905, the office was revived, and Mr. Handy received the appointment. His jurisdiction extended over the Lake Shore & Michigan Southern and Lake Erie & Western, as well as over the Indiana, Illinois & Iowa and the Lake Erie, Alliance & Wheeling, which had also been acquired by the Lake Shore. When General Manager W. H. Marshall was elected president of the American Locomotive Works, Mr. Handy was chosen to succeed him, his appointment dating Feb. 15, 1906, including all the lines mentioned.

Mr. Handy married a sister of his former chief, J. O. Osgood, and two sons were born to them, Jack, sixteen years, and Ned, fourteen years, both now attending school near Boston. The Handy residence is at 1909 East 93d Street.

More to Mr. Handy than any other man is due the preparation of the magnificent plans for the \$3,000,000 union depot proposed for Cleveland, so his business associates declare; and also the immense work of preparation and planning for new track construction, including the four-tracking of the Lake Shore from Buffalo to Chicago; the building of a new line into and through the mountains of Western Pennsylvania, and at least two gigantic railroad plans not yet completed in the immediate locality of Cleveland, which would do much to solve intricate transportation problems in this railroad centre.

Mr. Handy never lost sight of the merely local problems involved in building construction. He was general manager of the Lake Shore in fact as well as name. Yet he was not autocratic nor dictatorial. Rather he was companionable to his business and social associates and kind and personally interested in the welfare of his subordinates.

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MINUTE OF RESOLUTION BY THE EXECUTIVE COMMITTEE OF THE TECHNOLOGY CLUB OF NORTHERN OHIO

*Resolved*, That we mourn the loss of Edward A. Handy with a deep sorrow, personal to every one of us and to the whole community.

He was a man of exceptional ability and attainments, of high character and tireless industry, always cheerful, tactful, and kindly, and with a vein of genial humor that made him one of the most companionable of men.



He was one of the foremost citizens of Ohio, a leader among the civil engineers of America, and his career has been an example and an inspiration to the younger graduates of the Massachusetts Institute of Technology.

*Resolved*, That on behalf of the thousands of Technology graduates who knew "Ned" Handy and loved him, we extend our deepest sympathy to Mrs. Handy and their sons in this hour of bereavement.

Signed,

F. B. RICHARDS.

A. W. JOHNSON.

FREDERICK METCALF.

SIDNEY Y. BALL.

## BOOK REVIEWS

## A COURSE IN MATHEMATICS

The attention of all interested in the teaching of mathematics in engineering schools is particularly drawn to the first volume of "A Course in Mathematics," by Professor F. S. Woods and Professor F. H. Bailey, of the Department of Mathematics in the Massachusetts Institute of Technology. This volume is the most important American outcome of the deep impression recently made by the advocates of a reform in the methods of teaching mathematics. Such instruction may be viewed from two distinct standpoints. If the purpose of the instruction is to introduce the student to mathematics as a branch of pure science, in which he may later carry on research work, the best method may possibly be different from those adapted to acquainting a prospective engineer with one of the most useful helps science has to offer him. It is generally held to-day that without any sacrifice of accuracy the methods of instruction best adapted for the mathematical classes in a technical school are those which carry forward at the same time various branches. In the old methods of instruction it was customary to finish algebra before taking up analytic geometry, to finish analytic geometry before taking up the calculus, and to finish the calculus before beginning mechanics. As a result of this, it was only students with good mathematical memories who were able to appreciate as fully as desirable the relations between the various branches. Such a plan is entirely abandoned in this new course, which, it should be stated, was prepared at the invitation of Professor H. W. Tyler, head of the Mathematical Department of the Massachusetts Institute of Technology, and has received the benefit of his criticism. In the first volume, which alone has appeared as yet, there is an introductory chapter on methods of elimination, including the use of determinants. The student next takes up the methods of plotting

functions, and is thus introduced early in his course to this valuable practical method of understanding an equation. The study of the algebraic polynomial, including the analytic geometry of the straight line, the more important theorems of the theory of equations, and the definition of a derivative, comes next. This enables the student to obtain early an introduction to the principles of the calculus, which is particularly desirable. The study of the algebraic function in general is next taken up, and, in doing so, the student's knowledge of analytic geometry and calculus is enlarged by new applications of the principles previously stated. Simple integrations are also introduced at this time. Curves are taken up, and the student is introduced to this interesting portion of analytic geometry without being confused by the idea that it relates solely to conic sections. After this the study of elementary transcendental functions is begun, and finally the year's course closes with a study of the parametric representation of curves, polar co-ordinates and curvature. It will be noticed that no work in three dimensions is taken up in this course, that being deferred to the second year. It has already been stated that the book is primarily for the use of engineering students. It may be questioned, however, whether the student who takes up mathematics as a branch of a liberal education will not find this method of approaching the subject more satisfactory than the traditional one of attacking one branch at a time. The relations between the several branches taught in undergraduate courses is so intimate that it is safe to say only a student of exceptional natural mathematical ability can acquire so good a knowledge by pursuing one branch after another as by taking them up in the way outlined by Professors Woods and Bailey. It should also be stated, for the benefit of engineers who wish to review their mathematical studies, that this volume will be found an excellent help for the purpose. It is clearly written, well printed and illustrated, and contains a large number of examples which will be particularly helpful; for it is a well-known fact that a thorough comprehension of a mathematical method is only possible after it has been applied in the solution of a well-selected set of problems.—*The Engineering Record*, Nov. 16, 1907.